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AUTHOR	Severance, Lynn; Smith, Judy
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ABSTRACT

The document is a classroom teacher's guide to a series of 30 television lessons designed to introduce intermediate-grade children in the State of Washington to occupations in 14 fields of vocational work. The guide could be used by teachers who do not have access to the televised series as a framework for career education activities. Two constants relevant to survival (people are dependent on their environment; people are dependent on people) form the basis for the concepts developed in the lessons; the series does not emphasize vocational decision making, but provides the early exposure to the world of work necessary to develop realistic identification with people and needs. Each lesson guide presents the concepts to be developed, the lesson topic, its focus, the location of the television film, and background information. For each lesson, several in- and out-of-classroom activities are suggested. The purpose of each of these activities is given, the necessary materials listed, and the procedure specifically detailed, and illustrated where necessary. Appended to the guide are program music, student and teacher resources, and clusters of occupational models. (AJ)

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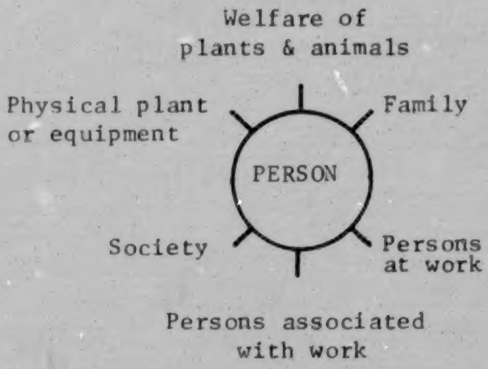
RATIONALE FOR THIS SERIES

In our rapidly changing and amazingly complex world, two human constants have become relevant to the survival of all living and non-living things: people are dependent on their environment, and people are dependent on people.

By observing these interdependent happenings in the world of work, young people may become aware that:

> Man, in order to survive and enjoy life, must live in harmony with his environment.
>
> Different types of work and materials are necessary for people to live together in an environment.
>
> Young people and their families are a part of the interrelationships that develop within the social, economic, political, scientific, and environmental frameworks of a society.

Because intermediate students learn best from real-life situations, it is important that they be given the opportunity to observe people relating to other people and their environment. Such a goal might be accomplished through the following perspective:


Welfare of plants & animals
Physical plant or equipment
Family
PERSON
Society
Persons at work
Persons associated with work

ROLE OF THE TEACHER

The thirty topics listed for this series were selected and programmed on the basis of availability for research, ease of photography, and interest of intermediate students. The occupations encompass one or more of the following fields of vocational work. Teachers may desire to build units with additional related topics and ideas:

- Transportation
- Public Service
- Personal Services
- Fine Arts and Humanities
- Manufacturing
- Marketing and Distribution
- Marine Science
- Hospitality and Recreation
- Health
- Communication and Media
- Environment
- Business and Office
- Construction
- Agri-business and Natural Resources

Teachers are also encouraged to provide follow-up activities for students to reinforce each lesson, such as those suggested in this guide. Background information has also been provided to aid the teacher during classroom question and answer discussion periods. Program music for each lesson is included in the appendix of this guide for classroom use.

It should be stressed that this series does not emphasize vocational decision making at the elementary level. An early exposure to the world of work is necessary to develop realistic identification with people and needs --- not the acceptance or refection of a prospective occupation. This philosophy should be reflected by the teacher in all discussions and activities.

NOTE: The television teachers would greatly appreciate any immediate feedback on this series in the form of teacher or student letters, pictures or phone calls. A questionnaire for teachers is located in the appendix section of this guide and may be used on an optional basis to evaluate one or more lessons.

Television teachers are available for classroom visitations; student field trips to the television station are also possible. To make arrangements call (543-2000) or write:

PEOPLE AT WORK
c/o KCTS-TV, Channel 9
University of Washington
Seattle, Washington 98195

THE SERIES AT A GLANCE

INTRODUCTION TO SERIES (Viewed with Lesson 1)

LESSON 1: MONKEY SEE, MONKEY DO

Concepts: Raw materials, such as steel and iron, are common foundations of ornamental and functional structures.

Topic: Iron Fabrication
Focus: Playground Equipment Fabricator
Location: Ross Iron Works, Seattle, Washington

LESSON 2: OH DEER! OH DEER!

Concepts: Various types of trees provide supplementary food for deer and rodents.

Non-harmful chemical control of animals and trees insures proper tree growth.

Topic: Tree Farm Nursery
Focus: Field Chemist
Location: Weyerhauser Gilbert Farm, Centralia, Washington

LESSON 3: TIMBER-R-R!

Concepts: A forest can contribute useful products to our world community if skilled workmen balance its harvest and growth.

Topic: Forest Conservation
Focus: Tree Faller
Location: Simpson Timber Company, Shelton, Washington

LESSON 4: GET READY, SET, GO!

Concepts: Forest fires damage thousands of timber acreage in Washington every year.

Since speed is essential, airborne firefighters are needed to control fires and prevent their possible growth.

Topic: Fire Prevention
Focus: Smoke Jumper
Location: U. S. Forest Service, Twisp, Washington

LESSON 5: SO, WHAT'S NEW?

Concepts: Communication of current events is necessary for an awareness of local and world happenings.

Topic: Television News
Focus: News Reporter
Location: KIRO-TV, Seattle, Washington

LESSON 6: THIS IS A RECORDING

Concepts: A communication system depends partially on the technical skill and knowledge of a telephone company. Because of growing environmental aesthetics awareness, more overhead telephone wires are being placed underground.

Topic: Telephone Service
Focus: Cable Splicer, Underground Wires
Location: Pacific Northwest Bell, Seattle, Washington

LESSON 7: PICK OF THE CROP

Concepts: Tended by migrant and permanent workers, a variety of fruits are grown and harvested year 'round in Washington for commercial use.

Topic: Fruit Harvesting
Focus: Field Picker
Location: Yakima and Zillah, Washington

LESSON 8: HOW DOES YOUR GARDEN GROW?

Concepts: Because of threats from pollution and food shortages, faster growing and healthier forms of aquatic life are being cultivated in controlled environments.

Topic: Aqua Culture
Focus: Lummi Indian Team Effort, Aqua Culture Project
Location: Lummi Indian Reservation, Washington

LESSON 9: HEAVE HO!

Concepts: Conservation of food fish resources includes the managing and regulating of commercial fisheries, allowing harvest without damage to resources.

Salmon are the most valuable fisheries resource of the state of Washington.

LESSON 9: HEAVE HO! Continued

Topic: Commercial Fishing
Focus: Purse Seiner Captain and Crew
Location: The Jamie "C," Puget Sound, Washington

LESSON 10: AW, SHUCKS!

Concepts: Commercial bedding and harvesting from Washington's coastline provides valuable shellfish as a food source.

Topic: Oyster Farming
Focus: Shucker
Location: Willapa Bay, Washington

LESSON 11: ONE MORE TIME

Concepts: Made from raw materials, glass containers are used for a variety of reasons.

To minimize the removal of these materials from the natural environment and to reduce pollution, used glass products are being reclaimed and reused.

Topic: Glass Making
Focus: Forming Operator
Location: Northwestern Glass Company, Seattle, Washington

LESSON 12: THINK BEFORE YOU DRINK

Concepts: Water purification is a vital necessity to every community. An increase in population, products, and pollution has prompted the use of more complex methods to purify water.

Topic: Water Quality (Sewage Treatment)
Focus: Water Quality Control Plant Supervisor
Location: Metro, Renton, Washington

LESSON 13: A STROKE OF GENIUS

Concepts: An artists' work reflects his feelings. Some artists can communicate an awareness and appreciation for the environment.

Topic: Silk-Screening
Focus: Artist, Elton Bennett
Location: Hoquium, Washington

LESSON 14: TO BE OR NOT TO BE

Concepts: Every child is a potential creator. Participation in the creative arts provides a means of enjoying and enriching life through experience.

Topic: Children's Theatre
Focus: Child Actor, "House At Pooh Corner"
Location: The Playbarn, Bellevue, Washington

LESSON 15: A STITCH IN TIME . . .

Concepts: Proper clothing is necessary for protection from the environment during winter recreation.

Topic: Ski Jackets
Focus: Seamstress
Location: Pacific Trail Company, Seattle, Washington

LESSON 16: A HOME AWAY FROM HOME

Concepts: The mentally retarded are real people representing a significant minority of Washington's population. Homes for the mentally retarded should be used as training centers whenever possible, instead of dead-end institutions.

Topic: Home for Mentally Retarded
Focus: Teachers
Location: Fircrest, Seattle, Washington

LESSON 17: GREENHOUSE FOR PEOPLE

Concepts: It is possible for a handicapped individual to grow, to learn, and to contribute to the community, if given the opportunity.

Topic: Social Rehabilitation
Focus: Goodwill "Worker of the Year," Martha Kelly
Location: Goodwill Industries, Seattle, Washington

LESSON 18: WANT MY AUTOGRAPH?

Concepts: The concern of a hospital is to restore health and encourage rehabilitation of patients. Cast making is an important role of a hospital's responsibilities.

Topic: Hospitals
Focus: Orthopedic Technician
Location: Children's Orthopedic Hospital, Seattle, Washington

LESSON 19: TOMORROW'S WHEELS?

Concepts: Air pollution, traffic congestion, and loss of natural lands, caused by an increasing number of vehicles, present a threat to the normal growth of metropolitan areas.

Topic: Rapid Transit
Focus: Monorail Operator
Location: Alweg System, Seattle, Washington

LESSON 20: FACE LIFTING

Concepts: Increased development of land for highway use has been the direct result of increased vehicle traffic, and the demand for better, more efficient facilities.

Topic: Department of Highways
Focus: Freeway Earthmover
Location: North Bend, Washington

LESSON 21: UP, UP, AND AWAY

Concepts: Increased air travel has prompted the development of faster and larger methods of transportation.

Topic: Aircraft - 747
Focus: Crane Operator
Location: Boeing Company, Everett

LESSON 22: HOT POT

Concepts: Copper is an important commodity to a community. The use of copper requires that it be extracted from mined ore.

Topic: Smelter
Focus: Converter Aisle Crane Operator
Location: American Smelting & Refining Company, Tacoma, Washington

LESSON 23: HIDE AND SEEK

Concepts: To prevent illegal entry and exit of materials and to maintain health standards, regular inspections are made at land, air, and water ports.

Topic: Bureau of Customs
Focus: Inspector
Location: Seattle, Washington

LESSON 24: A WET BEAT

Concepts: A police officer who patrols the water areas contributes to the safety and welfare of the community.

Topic: Police Department
Focus: Seattle Water and Air Patrol Officers
Location: Lake Union, Seattle, Washington

LESSON 25: BUILD A BETTER BOAT

Concepts: Fiberglas provides a longer lasting and more durable product. Its use in boat construction requires a workman skilled in this aspect of the total construction processes.

Topic: Fiberglas
Focus: Mechanic
Location: Ron Rawson, Inc., Redmond, Washington

LESSON 26: IN AND DOWN, UP AND OUT

Concepts: In the state of Washington, locks are constructed to link fresh water basins with marine waterways. Lock structures provide passage for vessels without offering considerable obstruction to migratory fish.

Topic: Locks
Focus: Locks Master
Location: Chittenden Locks, Ballard, Washington

LESSON 27: CRASH! BOOM! BANG!

Concepts: Progress sometimes requires the destruction of outdated structures, making room for newer facilities. Man is learning the necessity of foresight in the planning and building of cities.

Topic: Urban Renewal
Focus: Demolitionist
Location: Iversen Construction Company, Seattle, Washington

LESSON 28: FOOD FOR THOUGHT

Concepts: Transportation of grain from Washington is necessary to food consumption in other parts of the world. Technological advancement, and use of computers has changed the work emphasis at some grain terminals from that of manual labor to machine labor.

LESSON 28: FOOD FOR THOUGHT Continued

Topic: Grain Terminal
Focus: Computer Manager
Location: Pier 86, Seattle, Washington

LESSON 29: WHO'S IN CHARGE HERE, ANYWAY?

Concepts: Man can control the environment of animals beneficially by providing for their needs.

Topic: Zoo
Focus: Zoo Keeper
Location: Woodland Park Zoo, Seattle, Washington

LESSON 30: WE GOTTA WORK TOGETHER

Concepts: Many workers contribute to the creation and development of a fifteen-minute educational television program.

Topic: Production of a "People At Work" Program
Focus: Channel 9 Staff
Location: KCTS-TV, Channel 9, University of Washington, Seattle, Washington

We are two, the world and me. The world is just as I sense it (see it, touch it, smell it, hear it). The world is like me.

Unknown

INTRODUCTION TO SERIES (Viewed with Lesson 1):

(An introduction of the "People At Work" series focuses on the concept of work as it applies to the students themselves at home and school. The question is raised as to why it is important that people work together -- with each other and with their environment.)

LESSON 1: MONKEY SEE, MONKEY DO

CONCEPTS:	Raw materials, such as steel and iron, are common foundations of ornamental and functional structures.
TOPIC:	Iron Fabrication
FOCUS:	Playground Equipment Fabricator, Ross Ryan
LOCATION:	Ross Iron Works, Seattle, Washington
RELATED OCCUPATIONS:	None

BACKGROUND INFORMATION

WHO IS ROSS RYAN?

For the past 12 years, Ross Ryan has been the owner and operator of an iron fabrication shop. It is from this facility and mostly from his efforts that playground equipment is made. Most of the elementary schools in the Puget Sound area make use of this equipment.

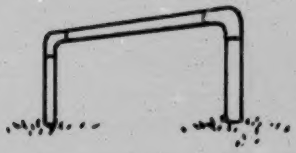
WHERE DOES THE MATERIAL COME FROM?

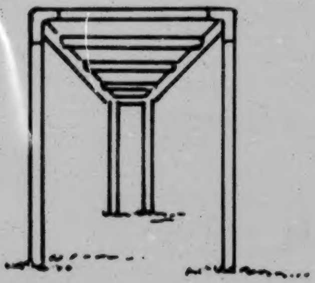
Beginning at the original point of process, mined iron ore is converted to molten ore in hot furnaces. After being poured into metal cans, it is cast into "pigs," or iron in a rough bar form. The pig iron moves on to a steel making furnace, where it is converted into steel --- steel that is rolled to make sheets, strips, bars, rails, and other structural shapes. Before the materials ever reach a fabrication shop, they are galvanized or sprayed with a coat of zinc for weather protection.

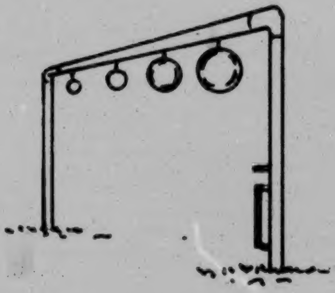
WHAT KINDS OF EQUIPMENT ARE MADE?

For recreational facilities and school grounds:

a. Chin Bar
b. Horizontal Ladders
c. Hair Pin
d. Bike Stands
e. Rings







HOW ARE THE "RINGS" MADE?

The circular rings are shaped from ½" galvanized pipes; a 17' pipe is used to hold 6 rings. Each ring is 3" in diameter, suspended from the pipe by a ½" u-shaped object.

The rings are bent by shaping. Since the steel is cold, they must be bent by hand or by a mechanical bender. The curved object is welded together to form a continuous piece.

All of the steel that is used for making playground equipment must be ground and filed to make a smooth product -- a product safe for children to play on.

SUGGESTED ACTIVITIES FOR LESSON 1

1. ACTIVITY: Discussion.

PURPOSE: To find out where students are in their concept of work.

MATERIALS: None.

PROCEDURE: Ask students to share their ideas of what kind of work they do each day. Evolve the discussion to a point where they can discuss some of the kinds of work others do each day that directly affects their lives. Include home, school and community workers.

2. ACTIVITY: Art Project.

PURPOSE: To start students thinking of the many people at work whom they depend on each day.

MATERIALS: Crayons, paint or magazines.

PROCEDURE: Let students choose which medium they would like to use to create their impression of important workers and what they do. Pictures from magazines could be used to create a collage.

3. ACTIVITY: Designing.

PURPOSE: To encourage individual creative thinking in design and construction.

MATERIALS: Pencil, paper.

PROCEDURE: Let each student create and design his own idea of a type of playground equipment. They should also take time to try and explain the construction of this object to fellow students --- as well as its purpose and means of use.

4. ACTIVITY: Survey.

PURPOSE: To note the use of playground equipment.

MATERIALS: None.

PROCEDURE: Divide the class into groups; the size of each group will depend on the number of kinds of playground equipment available to the schools.

SUGGESTED ACTIVITIES FOR LESSON 1 Continued

Allow each group to observe the use of their chosen piece of equipment during recess periods. Compare results of most used piece (discuss why), age groups using pieces, age group most using piece (discuss why).

LESSON 2: OH DEER! OH DEER!

CONCEPTS: Various types of trees provide supplementary food for deer and rodents.

Non-harmful chemical control of animals and trees insures proper tree growth.

TOPIC: Tree Farm Nursery

FOCUS: Field Chemist, Dr. Gauditz

LOCATION: Weyerhauser Gilbert Farm, Centralia, Washington

RELATED OCCUPATIONS: Other nursery personnel including
Planters
Caretakers
Cone Sorters
Cone Cleaners

BACKGROUND INFORMATION

WHY ARE TREE NURSERIES NECESSARY?

It has been estimated that one ton of wood and wood fibre products is demanded in the United States per person, per year. Since trees are a vital necessity (water shed protection and source of oxygen) as well as a commodity, it is very important they be replenished as often as they are harvested. It is for this reason that the Weyerhauser Company plants nine young trees for every one they harvest.

The replenishing process begins with the newly scattered seeds or with the newly planted seeds at the nurseries. At a nursery farm, the seedlings are carefully weeded, fertilized, and watered (mostly by women). At the end of two or three years, the young trees (only between 8" and 2' tall) are lifted from their rows by machines. They are kept in cool areas until planted in the woods by foresters. At the end of the first year in the woods, the nursery-raised trees will be twice as tall as the trees of similar age that sprouted naturally.

ARE ALL NURSERIES ALIKE?

No. They all have the same end interest -- to prepare young trees for life in the woods. But some nurseries are also used for experimental work, such as grafting. Shoots from selected superior trees are grafted to root stock to produce faster growing, volume increased, and more disease resistant trees.

WHAT IS THE GILBERT FARM?

The Gilbert farm has a very special purpose. Each year, Weyerhauser and other forestry firms, lose many young trees in the woods because of deer and rodents. These animals have a number of foods at their disposal, and to go without the new growth of young trees would not mean starvation. (The deer can eat the needles from older trees. This is not as detrimental since the first important growth is at the top of a tree.) To save the young trees, a field chemist works at the experimental Gilbert farm near Centralia --- developing tree sprays that will not harm the plants or the animals.

Thus far, two techniques have been developed and tested on the captive animals. One is to remove body odor (sweat and urine) from the deer and spray it on the trees. Because of their sense of territoriality, the deer will sniff the trees and then not intrude in that area. The other technique is to remove the remaining fluid from putrefied fish and spray it on the trees. For some reason, the deer and rodents shy away from the exposed area.

Eventually, these sprays (effective for three months) will be used on the nursery trees. Since trees are planted in the woods during the heart of winter (when the young tops are exposed above the snow and susceptible to eating), the time period will protect them until the snow melts. This alloted time will give the new trees a chance to grow.

WHERE DO THE SEEDS COME FROM?

There is really no beginning or no end to the regeneration of trees --- it is a continual process. As trees grow, cones develop. The cones, each filled with many seeds are collected by employees and public helpers once a year. They are heated to open and the seeds are removed, cleaned, cooled, and sent on to a nursery for replanting. From the time a seed is planted at the nursery until it is harvested in the woods, about 40 years has elapsed.

SUGGESTED ACTIVITIES FOR LESSON 2

1. ACTIVITY: Cone picking.

   PURPOSE: To involve students in the regeneration process.

   MATERIALS: Bags for storing cones.

   PROCEDURE: Beginning in September, cones are ready for picking. Weyerhauser Company will pay cash to young people or adults for assisting in this process. Contact the Weyerhauser office nearest your area and make arrangements for your class to be assigned to a particular area for picking.

2. ACTIVITY: Planting seeds.

   PURPOSE: Helping students understand the needs of tree plants for successful growth.

   MATERIALS: Seeds from Douglas Fir, Noble Fir, or Ponderosa Pine cones.

   PROCEDURE: In late September have students look for cones on the ground or remove one for the entire class from a neighborhood tree. Allow it to dry (heat if necessary) and then remove the many seeds.

   Soak the seeds in water for a day; then drain, and put them in a cool place (refrigerator) for 40 hours to a week. In a pot or in the ground, let the class plant their seeds about ¼" deep. Students should discuss other needs besides good soil (eg: sunlight, water), and provide their seeds with these conditions. Seeds should sprout in about 3 or 4 weeks. If they don't, discuss why.

3. ACTIVITY: Discussion.

   PURPOSE: To help students understand the need to protect the deer and other wildlife.

   MATERIALS: None.

   PROCEDURE: Encourage a class discussion by asking the students: "Why did Dr. Gauditz try to find a chemical solution that would protect the trees and, at the same time, not harm the wildlife?"

LESSON 3: TIMBER-R-R!

CONCEPTS: A forest can contribute useful products to our world community if skilled workmen balance its harvest and growth.

TOPIC: Forest Conservation

FOCUS: Tree Faller, Bob Gilcrest, Ray "Bunny" Carpenter

LOCATION: Simpson Timber Company, Shelton, Washington

RELATED OCCUPATIONS:
Felling Crew
Transporting Crew
Mill Crews

BACKGROUND INFORMATION

WHY IS FOREST CONSERVATION SO IMPORTANT IN WASHINGTON STATE?

There are 20 million acres of forest in Washington State, more than 1/2 the total land area. Washington ranks third in the United States in the production of lumber. About 70,000 people are employed in various forest industries.

WHAT IS THE MOST IMPORTANT ASPECT OF FOREST MANAGEMENT?

Two very important aspects are those of planting new growth and harvesting old growth. Whenever trees are felled and land cleared, reseeding should occur (naturally or by man). This makes possible a perpetual forest.

WHAT ARE THE MOST WIDELY USED HARVESTING PRACTICES?

There are various opinions on which method is the best, but clearcutting and selective cutting are the most widely used. An explanation of both is given by George R. Staebler, Director of Forestry Research for the Weyerhaeuser Company.

"A forest management system . . . must provide for the harvest of mature trees and the establishment of a new crop . . . .

"Clearcutting is a harvest system which removes all trees in a stand . . . at one time and prepares the land for rapid reforestation . . . . Clearcutting leads to even-aged stands of trees since the entire harvested area is regenerated at one time."

The selective cutting method provides "that only the oldest and largest trees are selected for harvest from the forest stand (plus excess trees of younger ages and smaller size classes), usually as individual trees but occasionally as small clumps of mature trees."

CONTROVERSY AND OPINIONS ABOUT BOTH METHODS . . .

"Clearcutting . . . leads to a pattern of even-aged stands intermixed on the forest property.
The selection system leads to an all-age stand where trees of all ages from seedlings to mature trees are in intimate mixture."

"Regeneration of a clearcut area is usually accomplished by planting or seeding, but natural seeding is also possible.
Regeneration in the selection forest is expected to result from natural seeding but if this fails, artificial means can be used . . . an expensive process since the need occurs in small areas or patches widely separated, requiring the time to search them out."

"Objections to clearcutting are mainly on aesthetic grounds. It is also frequently charged that the system leads to erosion, soil destruction, and changes in streams flowing from the cutover area. Such problems are the exception in today's intensively managed commercial forest where the type of cutting and subsequent management practices are tailored to the soils, topography and climate of the area in question. Potential problems which can affect soil productivity must be reckoned with in any harvest plan because the soil is the ultimate base upon which we depend for future crops. It is the aesthetic impact, however, that is the concern of many who view clearcuts, dislike what they see, and actively oppose the practice for that reason."

Objection to selective cutting in the Douglas fir forests of our Pacific Northwest is prompted by the fact that Douglas fir need direct sunlight to flourish and grow. This is not as possible when seeds or seedlings are planted amidst the variety of other types of trees that are in different stages of growth.

WHAT IS THE PROCESS IN MANUFACTURING LUMBER?

1. Trees to be harvested are marked.

2. A felling crew falls trees.

3. Felled trees may be cut into logs (bucking).

4. Logs are "bunched" to be moved from the felling area.

5. Logs or tree lengths are skidded, or moved, from the woods to a loading point.

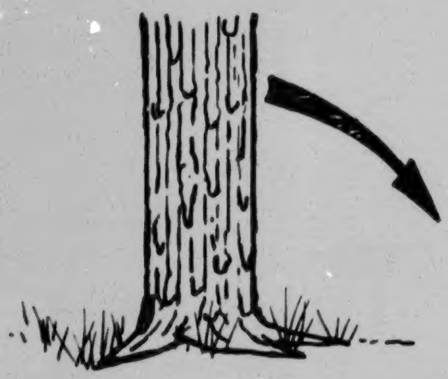
6. Logs or tree lengths are loaded for transportation.

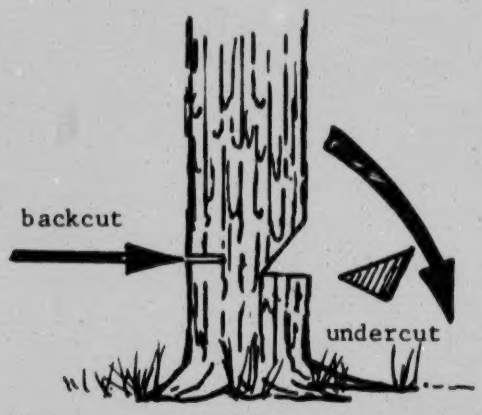
7. Harvested products are delivered to manufacturing or processing plants.

WHO IS RESPONSIBLE FOR FALLING THE TREES AND HOW IS IT DONE?

The worker who falls trees is called a faller. This is an important job because how it is done affects the value of the trees for the end product and it affects the future condition of the forest area where the trees are felled.

A faller determines the direction of the fall. The tree is undercut on the side toward which it is to be felled.





A skilled faller takes into account conditions that may upset the balance of the tree and makes his undercut so that (as accurately as possible) the tree will fall in that direction. The faller then makes a backcut with a power saw.

IS MUCH WOOD WASTED?

With proper forest management and increasing knowledge of ways to utilize raw materials, lumber should rarely be wasted. Even wood left at the falling site can be made into chips and sent to pulp mills. At the Simpson Timber Company's Camp Grisdale logging site, even bark and sawdust are used for fuel in the firm's power plant.

SUGGESTED ACTIVITIES FOR LESSON 3

1. ACTIVITY: Examination of different wood samples.

   PURPOSE: To realize different wood quality.

   MATERIALS: Wood samples (oak, redwood, pine; plywood).

   PROCEDURE: Have students examine and handle wood samples. Let them discuss similarities and differences as they discover them. What uses could be made of each type? A few students may want to do some research to find pictures of the different trees that supplied the wood.

2. ACTIVITY: Problem solving.

   PURPOSE: To determine wise use of the forest areas.

   MATERIALS: None.

   PROCEDURE: Present the students with this problem: "You will be in the woods for three days on a camping trip. Set up a list of ways you could best use the different forest resources available to you and still maintain your awareness of forest conservation."

3. ACTIVITY: Creative art project.

   PURPOSE: To create with wood.

   MATERIALS: Wood scraps (from woods or lumberyard), nails if scraps are large, cedar or pine are best.

4. ACTIVITY: Reading for fun.

   PURPOSE: To become aware of some woods folklore.

   MATERIALS: Books at your grade level about Paul Bunyan.

   PROCEDURE: Let interested students read and report. Encourage students to recognize any similarities or contrasts between the "Paul Bunyan" idea of yesterday's loggers and the loggers of today.

LESSON 4: GET READY, SET, GO!

CONCEPTS: Forest fires damage thousands of timber acreage in Washington every year.

Since speed is essential, airborne firefighters are needed to control fire and prevent their possible growth.

TOPIC: Fire Prevention

FOCUS: Smoke Jumper, Jim Grant

LOCATION: U. S. Forest Service, Twisp, Washington

RELATED OCCUPATIONS:
Spotter
Pilots
Training Instructors
Ground Crews

BACKGROUND INFORMATION

WHY ARE FIRE FIGHTERS NEEDED?

During the 1970 fire season, the following statistics were recorded for lands protected by the Forest Service in Oregon and Washington:

2,009 Lightning fires (156,384 acrea burned)
1,375 Man-caused fires (4,527 acres burned)

For the past few years, nearly 125,000 fires have burned yearly in the continental United States -- covering about 5,000,000 acres. Nine out of every ten of those fires were caused by human carelessness!

The concern to prevent these fires is five-fold. Loss of forest land means:

1. Fewer trees to supply wood necessary to meet public needs.
2. An impairment of watershed protection.
3. A loss in the supply of oxygen to living organisms.
4. Fewer recreation sites.
5. A loss of natural habitats to living organisms.

WHAT ARE SMOKE JUMPERS?

Also known as the shock troops, smoke jumpers are airborne firefighters. The purpose of a jumper? To parachute into mountain timber and attempt to control small fires before they have a chance to spread. Such a procedure has saved thousands of forest acres. The first jumps for the Forest Service took place in 1939, led by Francis Lufkin. Already a fire guard and a professional parachutist, Lufkin helped to organize jumping camps in Washington and Montana. Until his retirement in 1972, Lufkin was the Project Officer for the North Cascades base located between Twisp and Winthrop. This is the only training base in Washington.

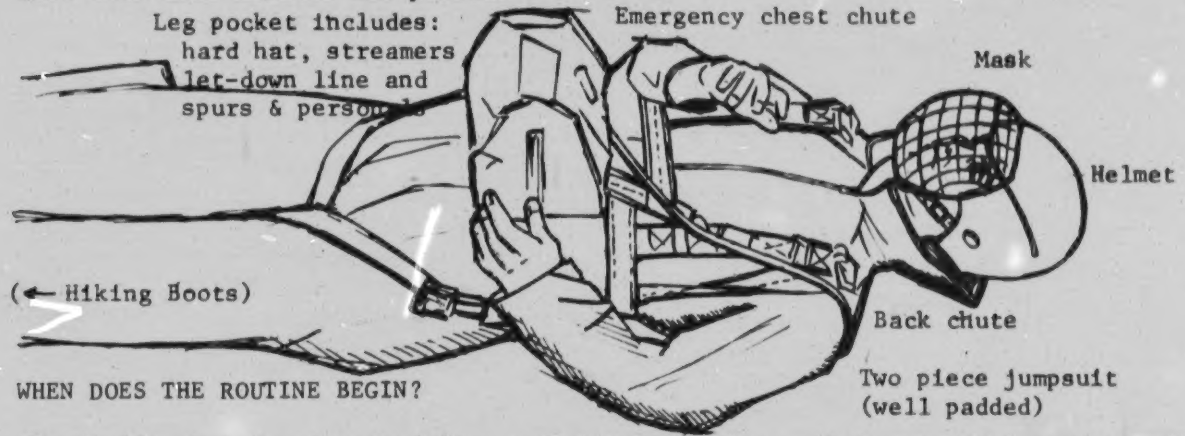
HOW CAN ONE QUALIFY AS A JUMPER?

A trainee must be at least 18 years old, weigh between 130 and 195 pounds, stand not less than 5'5" and not more than 6'3" and be of good health. He must also have served at least one summer in fire control work. Over 200 applications are received by the Forest Service each year for this training camp, but only about 15 are approved (a good percentage of these are college students.)

For those who are accepted at the base, the program is far from being easy. During their 4 weeks of training, a variety of exercises are necessary to strengthen the back, leg, and arm muscles. The "rookies" must also practice parachute landing techniques and simulate jumps from a tower. Seven training jumps are required before a trainee is qualified to make a fire jump. All jumps, training or fire, are made with the aid of a static line. This is a nylon cord attached to the plane and the jumper's chute; the chute opens automatically with the impact of the jump. No Forest Service smoke jumpers make free falls!

HOW ELABORATE IS A SMOKE JUMPER'S WARDROBE?

A smoke jumper usually takes about 1½ minutes to suit up; the gear needed weighs about 70-90 pounds and is listed with the following sketch. From the time the fire alarm rings until the time that the loaded airplane takes off, usually no more than nine minutes has passed.



WHEN DOES THE ROUTINE BEGIN?

When a fire has been spotted from a look-out station, it is reported to the smoke jumping base. The radio dispatcher sounds the fire alarm, and the number of jumpers needed suit up. The plane takes off with the fire crew and drop equipment. Upon landing (jump from 2,000'), the men must gather up their chutes, remove jump suits, and proceed to put out a fire. The drop equipment includes their shovels, picks, food and canteens, paper, bed roll, etc. that they will need. Ground crews assist the smoke jumpers if the fire is not easily controlled.

SUGGESTED ACTIVITIES FOR LESSON 4

1. ACTIVITY: Fire prediction.

PURPOSE: To learn how to forecast fire dangers.

MATERIALS: Wooded environment.

PROCEDURE: During the day, as the temperature increases, the moisture in the air evaporates. The result is a decrease of the fuel moisture. In a wooded area, allow the students to feel the ground material (limbs, needles, twigs, dead material.) Let them decide if it feels very dry or moist.

Pick up small twigs from the forest floor and break them in two. The fuel moisture will be low if they snap when broken. The fuel moisture will be medium or high if they break without making a loud snap.

Let the class decide if their area is in fire danger. If it is, what should they do?

2. ACTIVITY: Fire prevention.

PURPOSE: To determine fire causes and possible prevention measures.

MATERIALS: None.

PROCEDURE: Initiate a discussion period that allows students to suggest causes of forest fires. List these, as they are mentioned, on the blackboard for all to see. When the suggestions are exhausted ask the students to go back and suggest ways that many of these causes can be prevented. How can they, as students, help to enforce these preventive measures? What happens to the forests if the measures are not heeded?

LESSON 5: SO WHAT'S NEW?

CONCEPTS: Communication of current events is necessary for an awareness of local and world happenings.

TOPIC: Television News

FOCUS: News Reporter, David Marriott

LOCATION: KIRO-TV, Seattle, Washington

RELATED OCCUPATIONS:
- Cameraman
- Dispatcher
- Anchorman
- Fourth grade students giving their news report
- People shown in news clips -- Mayor, Governor, President, Police Force

BACKGROUND INFORMATION

WHY IS A NEWS MEDIA NECESSARY?

No one person could ever witness all the happenings in the world. The news media (television, radio, newspapers and magazines), however, can provide a link between people and other people and happenings. The television is unique in that it can offer both a visual and an aural effect. A news reporter for a television station is somewhat of a representative of the people to these current events --- watching and listening and then giving them an account. He, or she is normally accompanied by a cameraman who is trained to capture the visual story.

WHAT IS A "TYPICAL" DAY FOR A TV NEWS REPORTER?

There is really no such thing as a "typical" reporting day. Some writers arrive about 6:00 in the morning to begin their work. They scan the international wire service, select items from the previous evenings news program, and check for local events that might have occured during the night. This information is assembled to form the first news program of the day. About 7:30 a.m., a newsman begins to map out the activities of the day; these are usually the first assignments to be covered. Finally, additional reporters and cameramen arrive, receive their assignments, and embark on their tasks.

Throughout the day, a radio dispatcher keeps in close contact with each of the reporter-cameraman teams. The teams are re-routed in location as events occur. (The dispatcher receives tips from reporters and from the police radio that is monitored in the news room.) Some assignments are pre-scheduled, such as press releases or planned news; but much of it is unpredictable.

HOW DOES A TEAM WORK TOGETHER?

As the team arrives at their destination or event, the cameraman selects quickly whatever equipment he will need. This could be anything from a small hand camera to a shoulder-harnessed camera assisted by lights. The reporter positions his tape recorder and microphone, and gathers background information about his subject matter. On cue from the reporter, the cameraman shoots film footage that will reinforce the information. The camera film has a magnetic tape on it so sound will be synched precisely with the visual.

WHAT HAPPENS TO THE FILM?

At different times of the day, the used film footage is returned to the TV station for processing. The average time needed to process a roll of film is 26½ minutes; if necessary, it can be done in 13-15 minutes. The reporter views the film, accompanied by sound, and decides what he wants to keep to emphasize the events. The cameraman then spends time cutting and splicing the film for program use.

WHAT IS A TV NEWS SCHEDULE?

The schedule is an organized time sheet showing a second-by-second account of what will happen during a news program. This is arranged prior to a program and includes much of the available reported news. A schedule might begin with:

:00:00	
:15	
:30	
:45	OPEN
:01:00	David Bruce
:15	Drugs
:30	Cambodia VTR
:45	
:02:00	
:15	
:30	
:45	
:03:00	Germs
:15	
:30	Florida Riots
:45	TEASE
:04:00	
:15	BREAK #1
:30	
:45	

LESSON 5: BACKGROUND INFORMATION Continued

The conclusion of an hour long news program might look like:

:25:00 Editorial VTR
:15
:30
:45
:26:00
:15
:30
:45
:27:00 Wrap-up
:15
:30
:45
:28:00
:15
:30 CLOSE

NOTE: VTR - Video tape recorded material
TEASE - Remarks leading up to break
BREAK - Station break and commercials

SUGGESTED ACTIVITIES FOR LESSON 5

1. ACTIVITY: News reporting.

PURPOSE: To help students understand some of the skills involved in news gathering and reporting.

MATERIALS: Pencils and pads; tape recorders.

PROCEDURE: Divide the class into groups, the size of each group will depend on the number of tape recorders available. Allow each group to choose a topic to cover, eg: sports, weather, editorial, school news, community news, etc. For one week, have the students role play the position of a reporter - watching, listening, questioning, writing.

At the end of the week, each group should organize their news and present it in an interesting manner or tape for the rest of the class to hear. The students might even want to share their recordings with other classes in the school.

2. ACTIVITY: Editorializing.

PURPOSE: To define and understand the term.

MATERIALS: None.

PROCEDURE: Select several students to role play an accident in front of the class. Have the other students write what they observed - attempting to be objective in their response and telling only what they saw. Let the role playing be repeated. Again, have the class write what they saw, only this time let them reflect their real feelings about the incident. Compare and discuss these two kinds of reporting. Did the students find it easy or hard to write objectively? Discuss the reasons for and against biased reporting.

LESSON 6: THIS IS A RECORDING

CONCEPTS: A communications system depends partially on the technical skill and knowledge of a telephone company. Because of a growing environmental aesthetics awareness, more overhead telephone wires are being placed underground.

TOPIC: Telephone Service

FOCUS: Cable Splicer, Underground Wires, Phil Stewart, Barney Arstad

LOCATION: Pacific Northwest Bell, Seattle, Washington

RELATED OCCUPATIONS:
- Installer
- Telephone Operator
- Manager of Yellow Pages
- Instructors
- Change Counter for Pay Telephones
- Auto Mechanics
- Computer Operators
- Engineers
- Linemen
- Service Representatives

BACKGROUND INFORMATION

IN WHAT WAYS IS THE TELEPHONE INDUSTRY IMPORTANT TO SOCIETY?

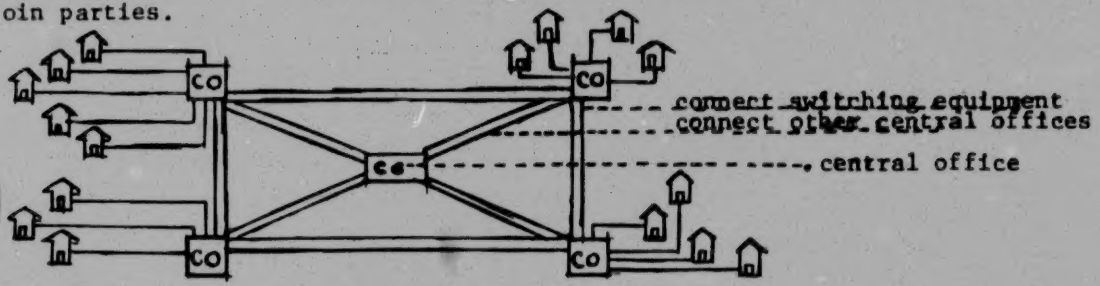
Our need for communication increases as our population and economy grow. Technological advancements have made it possible for the telephone industry to offer many employment opportunities for both men and women in almost every community of the United States.

DOES ONE PERSON OWN THE TELEPHONE COMPANY?

There are two groups that own the domestic telephone network --- the Bell System and independent telephone companies. Bell serves about five out of six of the nation's telephones.

IS ONE PART OF THE TELEPHONE SYSTEM MORE IMPORTANT THAN ANOTHER?

All parts of the system (workers and equipment) are important and interdependent. The heart of the system is the central office; it contains the switching equipment through which a telephone may be connected with another telephone. Every call made travels from the caller through wires and cables to the cable vault in the central office. In turn, thousands of pairs of wires fan out from this central vault to a distributing frame where each set of wires is attached to switching equipment. The connections that are made through the switching equipment join parties.



WHAT KINDS OF WORKERS ARE EMPLOYED BY THE TELEPHONE INDUSTRY?

Among the workers employed are telephone operators, clerical workers, public relations personnel, telephone installers, repairmen, linemen, and cable splicers.

WHAT IS THE JOB OF THE CABLE SPLICER?

Cable splicers complete the line connections after linemen have placed cables on poles or in underground vaults. Splicers connect individual wires within a cable or vault by matching colors of wires so as to keep each circuit continuous. Cable splicers can also rearrange wires within a cable or vault when lines have to be changed. At each splice, they either wrap insulation around wires and seal the joint or cover the splice with some closure.

NOW THAT MANY OVERHEAD WIRES ARE BEING PLACED UNDERGROUND, WILL THIS AFFECT THE WORK OF THE CABLE SPLICER?

As streets are widened, poles and wires need to be moved. A larger population requires more power and phone service. This means more wires. People want a beautiful environment, not one that looks cluttered with many telephone and power wires.

The cable splicer will continue to be needed to work on wires above and below ground. He is needed to connect wires within the vaults that are underground in various neighborhoods. They connect wires from the caller's house to wires that go to the central office switching equipment. These underground wires may be enclosed in an underground terminal (yellow jacket) that replaces the small terminal that was on telephone poles. More wires may be placed in a large closure vault and fed through a frame.

SUGGESTED ACTIVITIES FOR LESSON 6

1. **ACTIVITY:** Creating a class phone book.

   PURPOSE: Class communication, committee work, awareness of important phone numbers, skill in alphabetization.

   MATERIALS: Local telephone directory, class list of first and last names, accurate collection of phone numbers.

   PROCEDURE: Determine importance of a class phone book. Determine information to be included. Suggested material: alphabetized class members listings, information, local, long distance, how to make a long distance call, emergency numbers, party line etiquette, prank calls, obscene calls and what to do.

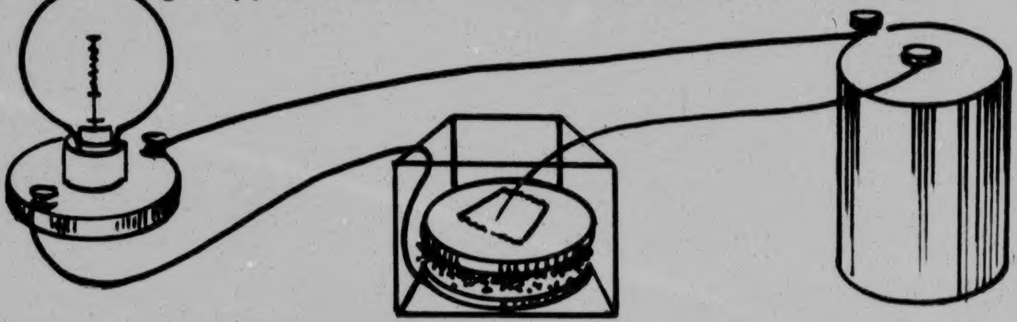
   Committees of students could choose sections to work on once format is determined.

2. **ACTIVITY:** Science demonstration of how telephone receivers contain electromagnets that help change spurts of electrical energy to sound energy.

   PURPOSE: To find out how it is possible to hear a person almost instantly when a telephone is used.

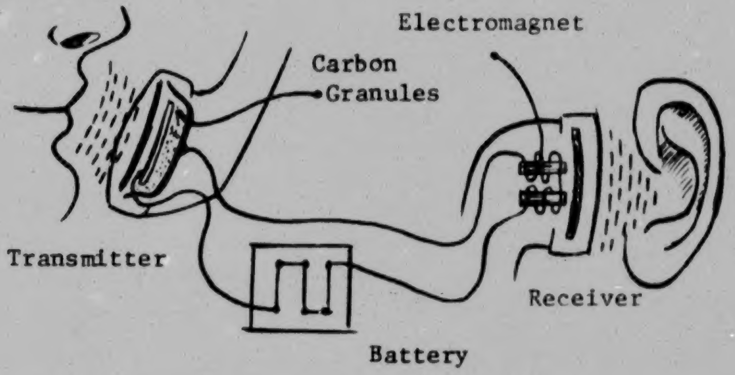
   MATERIALS: Carbon rod from an old dry cell; hammer; two 25-cent pieces; bell wire; cellophane tape; dry cell; miniature lamp and socket; large sketch of a telephone transmitter and receiver; if possible, a real telephone (local telephone companies usually will lend useful materials to schools); electromagnet; paper clips.

   PROCEDURE: Place the carbon rod on some paper and break into small pieces with a hammer. Take two large coins. Tape the end of 2 bared wires to the coins. Complete the rest of the circuit as shown in the figure. Make a "sandwich," placing carbon granules between the two coins. A clear plastic container over coins and granules will prevent their scattering. Have a student press down on coins gently, then harder. What is seen? Why does it happen?



SUGGESTED ACTIVITIES FOR LESSON 6 Continued

Substitute an electromagnet for the light. Note its varying power of attraction with paper clips as the coins are pressed and released.



Project a sketch of a telephone transmitter and receiver (Figure #2). Point to the two diaphrams telling students that they are made of very thin metal that can vibrate. Carbon granules in the transmitter are like those in our experiment above.

Have the class study Figure #2 and give an explanation of how the phone works. (Sound vibrations from voice variably squeeze the carbon granules. Granules conduct variable electric impulses as opposed to a steady current. These impulses are transmitted in the wire. Sound energy is used to provide electrical energy.)

LESSON 7: PICK OF THE CROP

CONCEPTS: Tended by migrant and permanent workers, a variety of fruits are grown and harvested year 'round in Washington for commercial use.

TOPIC: Fruit Harvesting

FOCUS: Field Picker, Elma Longoria

LOCATION: Yakima and Zillah, Washington

RELATED OCCUPATIONS:
- Planters
- Caretakers
- Grafters/Pollinaters
- Thinners
- Ranch Owner and Legislative Representative, Sid Morrison
- Migrant Workers
- Teachers with Migrant Children
- Truck Drivers
- Processing Plant -- Graders, Packers, Inspectors

BACKGROUND INFORMATION

WHAT KINDS OF FRUITS ARE GROWN IN WASHINGTON?

Fruits are generally grown in three kinds of climate: tropical, subtropical, and temperate. Washington fruits are grouped within the temperate zone and include a wide selection: grapes, apples, peaches, apricots, cherries, pears, plums, and a variety of berries. Apples are probably the largest commercially grown fruit product in Washington. In 1969, close to 1,625,022,000 pounds of apples were raised and marketed.

WHAT CARE IS NEEDED IN THE ORCHARDS?

A fruit ranch involves many stages of operation:

1. Budding - new apples are usually grown from buds, the buds are cut from healthy trees and grafted to strong roots of seedling apple trees.
2. Pruning the trees - weak branches are cut during the winter season.
3. Spraying - to protect trees from insect pests and fungus diseases; frequency depends on kind of fruit and extent of natural predator insects used.
4. Thinning the fruit - sometimes too much fruit begins to grow after the bees have pollinated the blossoms; in June, it may be necessary to eliminate some of the early fruit so the remainder will have a better chance of reaching a good size.

5. Irrigating and mowing of ground area.

6. Harvesting - carefully picked by hand and put into pails or bags; transferred to boxes and transported to packing houses. On a large ranch, cherries can be harvested in June, apricots in July, prunes in late July, pears in early August, apples in early September, and grapes in late September.

WHO TENDS THE ORCHARDS?

For some workers, fruit ranching is a year 'round operation; for many, it is part time. The permanent workers assist with the budding, pruning, spraying, thinning, irrigating, and harvesting. They live near, and confine their work to one ranch. Part time workers usually are involved with more than one ranch or farm; many of these workers are referred to as migrants. During April, migrant families come to areas like the Columbia Basin, the Yakima Valley, Chelan and Douglas counties, and Whatcom and Skagit counties for employment.

Many of the migrant workers follow this six month pattern:

1. String hops
2. Block and weed sugar beets
3. Help prepare orchards
4. Harvest potatoes and onions
5. Bring in corn
6. Pick fruit
7. Cut and process hops
8. Pack apples
9. Dig sugar beets

When the winter months begin, many of the families return to their warmer climates to continue harvest work.

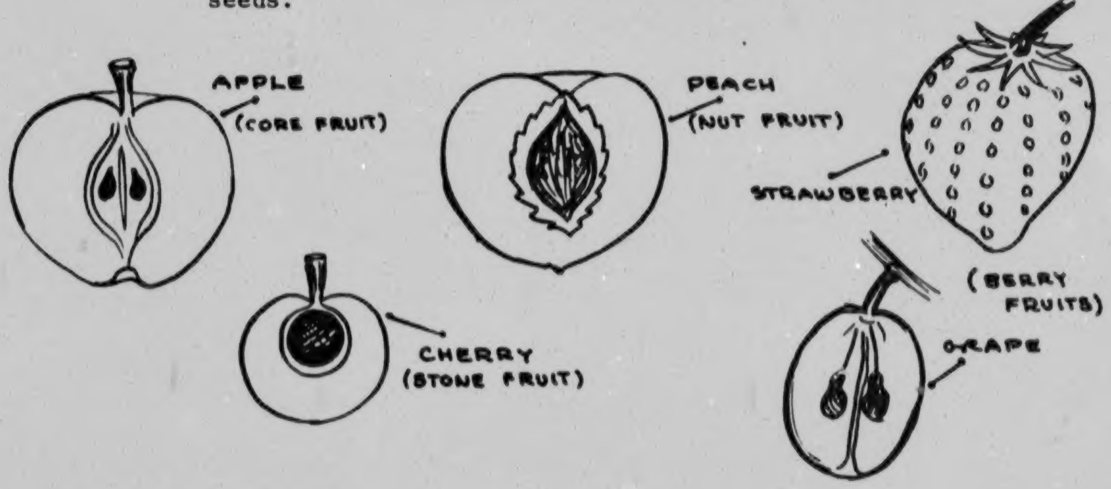
DO THE MIGRANT FAMILIES HAVE A FUTURE IN WASHINGTON?

Two major problems face the migrant families: employment for workers, and education for children. The present agricultural trend is to replace much of the human labor with machine labor. Whether or not this increase in mechanization will be seen in the fruit fields is, at this time, unknown. Higher wages or fewer employees and more machinery -- these are issues affecting the ranch owners and farmers.

The lack of academic education by migrant children has just recently become an important issue. Because of their frequent movement and cultural differences (many speak mostly Spanish), children of migrant farm laborers were, for many years, rejected from the schools. Deficiencies soon developed at academic, health, and social levels. In 1967, new compensatory programs were initiated to provide a variety of experiences to these children during the summer months that they are in Washington. In-service training and courses are now offered to teachers and citizen aides who wish to become involved.

SUGGESTED ACTIVITIES FOR LESSON 7

1.	ACTIVITY:	Migrant families.
	PURPOSE:	To become more aware of the living routines of migrant families.
	MATERIALS:	None.
	PROCEDURE:	Initiate a class discussion by raising the question, "What problems do you think migrant families must face, and what solutions or alternatives are available?"
2.	ACTIVITY:	Seed collecting.
	PURPOSE:	To observe a variety of fruit seeds.
	MATERIALS:	Selection of fruits.
	PROCEDURE:	Bring several kinds of fruit into class and allow the students to remove the seeds. Discuss any differences noted with the seeds.



3.	ACTIVITY:	"Fruits" and "Vegetables."
	PURPOSE:	To differentiate between fruit and vegetable products.
	MATERIALS:	Selection of fruits and vegetables.
	PROCEDURE:	Display the products for student observation, and allow them to classify the items into fruits and vegetables. All seed-bearing plants produce fruits! (Be sure to include a tomato in the display.) After classification, discuss the necessity of fruits and vegetables to human growth -- and the necessity of humans to provide a proper environment for fruit and vegetable growth!

LESSON 8: HOW DOES YOUR GARDEN GROW?

CONCEPTS: Because of threats from pollution and food shortages, faster growing and healthier forms of aquatic life are being cultivated in controlled environments.

TOPIC: Aqua Culture

FOCUS: Lummi Indian Team Effort, Aqua Culture Project

LOCATION: Lummi Indian Reservation, Washington

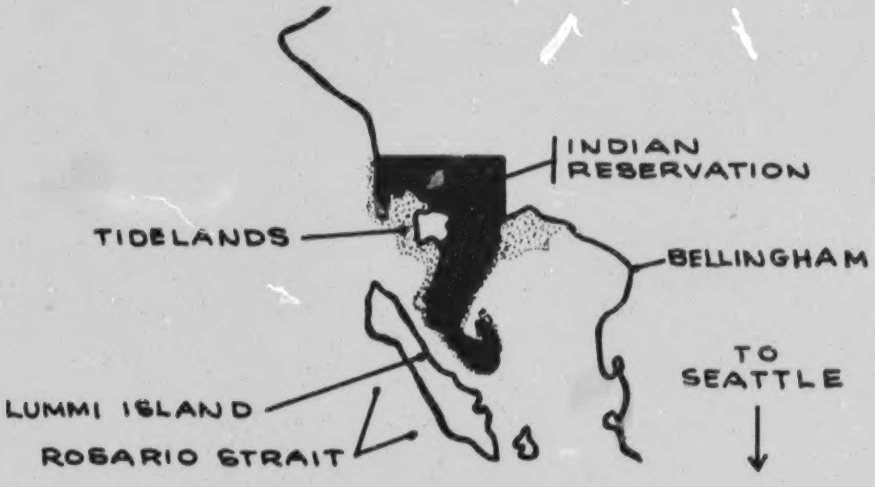
RELATED OCCUPATIONS:
- Construction Workers preparing underwater plots and dike
- Director of Training Program
- Students in lab
- Cultivators
- Seaweed Harvesters
- Home Builders
- Indians celebrating and feasting in traditional ways

BACKGROUND INFORMATION

WHO ARE THE LUMMI INDIANS?

Originally living on the San Juan, Orcas, Lopez and Lummi Islands, the Lummi Indians were once the frequent target of hostile northern Indians. With little territorial protection from the islands, the Lummi's moved to the mainland that encompasses Bellingham Bay. In 1858, the government established the Lummi Indian Reservation on 12,500 acres in northwestern Washington. Today, the Lummi's concontrol only about 7,618 of those acres; the remaining 40% is now owned by non-Indians. The Lummi population at the present time reaches 1,500, most of whom live on the Revervation; others live in off-reservation communities like Marietta, Ferndale, and Bellingham.

Until recently, nearly 80% of the Lummi population lived on incomes below the poverty level. With the aid of new government and personal funds, programs began to emerge in early 1969 in career development, community services and housing. Probably the most significant new program on the Reservation is the Aqua Culture Project, which will shortly provide employment and training for over 250 potential operators.



WHAT IS THE AQUA CULTURE PROJECT?

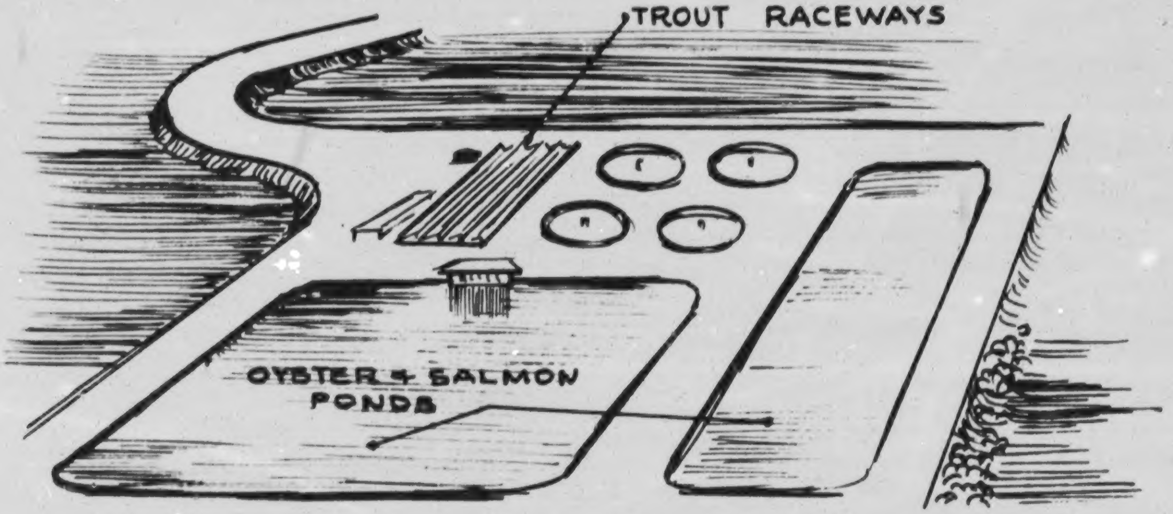
Aquatic life has always been a major source of food for Lummi Indians. Today, the Lummi's exhibit a strong sense of ecological awareness toward the marine and fresh water environments surrounding the Reservation. Five divisions make up their Aqua Culture Project:

1. A training program
2. Water quality studies
3. Seaweed harvesting
4. Oyster farming
5. Fish ponds

All persons who participate in the program must have some background in marine biology. With the assistance of college professors, trainees of various ages attend a one year, eight-hour day course involving refresher math, basic biology, basic chemistry, and water quality control; specialized training in fish and oyster nutrition, diseases, hatchery and rearing techniques, food algae production and selective breeding is also covered.

Water quality studies are made frequently to test nutrient levels and physical and chemical factors. Pollution tests are also run to check for contamination of aquatic life to domestic and industrial effluence.

Controlled water and temperature conditions, plus constant feeding promote the accelerated growth of oysters in tidal ponds and the Donaldson (SST - super sea trout) and silver salmon in "raceways" and ponds. Do the controls help? Definitely! Normally a trout takes almost a year to develop from egg to harvesting stage; in the "raceways," the process takes about three months. The average time limit for an oyster to develop from seed to harvesting stage is about four years; in the tidal ponds, the time is cut by nearly three years.



The final phase of the program is seaweed harvesting. Nearly 60,000 pounds of red seaweed were brought up from the ocean floor by Lummi divers during the summer of 1970.

HOW SUCCESSFUL IS THE AQUA CULTURE PROJECT?

The facilities for the project are being developed in three stages:

1. 6 acre pond developed for feasibility study
2. 750 acre sea pond (dike completed in the summer of 1971; inlet and outlet gates allow the tide to flow in and out of the secluded area - providing a natural circulation pump).
3. 2500 acre pond expected to be built by 1974 or 1975.

These are not three separate facilities. As the program grows the ponds are only extended or added onto. Evidence indicates that eventually the fish in these facilities will be able to grow at the rate of 5,000 pounds per acre, per year. At the same time, some 200,000 oysters per acre could also be grown.

The project has definitely affected the Lummi population by giving them a new hope and determination for social and economic growth.

SUGGESTED ACTIVITIES FOR LESSON 8

1. **ACTIVITY:** Oil spills.

   PURPOSE: To note the effects of pollution on aqua culture.

   MATERIALS: Picture of diked area and map from Background Information.

   PROCEDURE: Raise the following question to students, "What would happen to the Lummi Project if a tanker had a heavy oil spill in the Georgia Strait?" Discuss the effects of the spill on the aquatic life in and outside of the diked area (including the seaweed). Discuss also whether or not the dike could serve as a barrier to the oil movement (remember the inlet and outlet gates for the tide). Question with the students the overall effects to the Indians and their economy.

2. **ACTIVITY:** Testing.

   PURPOSE: Understanding water quality tests.

   MATERIALS: Thermometer, Ph kit (obtain from science consultant or high school.)

   PROCEDURE: Following the directions for a Ph kit, determine how acidic or alkaline the water in your area is. With the help of the scale, decide what kinds of aquatic life should be living in the water:

Most Acid — Neutral — Most Alkaline
1 2 3 4 5 6 7 8 9 10 11 12 13 14

6.5 — 7.5
Largest variety of animals, trout, May fly, stonefly, caddis fly.

7.0 — 9.0
Snails and clams

6.5 — 8.5
Bass and crappie

6.0 — 9.0
Carp, suckers, catfish, some insects.

6.5 — 12.0
Plants (algae, rooted, etc.)

1.0 — 13.0
Bacteria

SUGGESTED ACTIVITIES FOR LESSON 8 Continued

Using a thermometer, test the water temperature at different times of the day. Determine what kinds of aquatic life can live in your water.

Temperature greater than 65°F

Much plant life, catfish.

Temperature less than 65°F

Caddis fly, water beetles, striders, bass, carp, crappie, some fish diseases, trout, stonefly, May fly.

(Adapted from Ernie McDonald)

3. ACTIVITY: Discussion.

PURPOSE: To develop an appreciation for individual differences and a sense of pride.

MATERIAL: Poem: "Proud To Be Me"

PROCEDURE: Initiate a class discussion after reading the poem to students.

PROUD TO BE ME

I'm proud to be me, but I also see you're just as
  proud to be you.
We might look at things a bit differently but lots
  of good people do.
That's just human nature, to build for the future,
To share as we grow, you and I.
We'll get as we give, if we live and let live and
  we'll all get along if we try.
I'm proud to be me, but I also see you're just as
  proud to be you . . . it's true,
You're just as proud to be you.

LESSON 9: HEAVE HO!

CONCEPTS: Conservation of food fish resources includes the managing and regulating of commercial fisheries, allowing harvest without damage to resources.

Salmon are the most valuable fisheries resource of the state of Washington.

TOPIC: Commercial Fishing

FOCUS: Purse Seiner, Captain Alan Coles and Crew

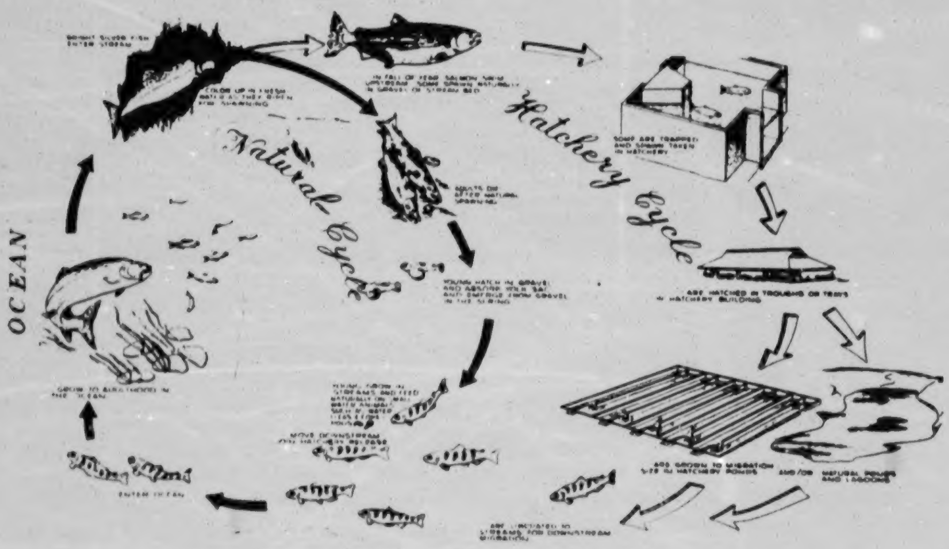
LOCATION: The Jamie "C," Puget Sound

RELATED OCCUPATIONS: None

BACKGROUND INFORMATION

WHY ARE SALMON IMPORTANT TO WASHINGTON?

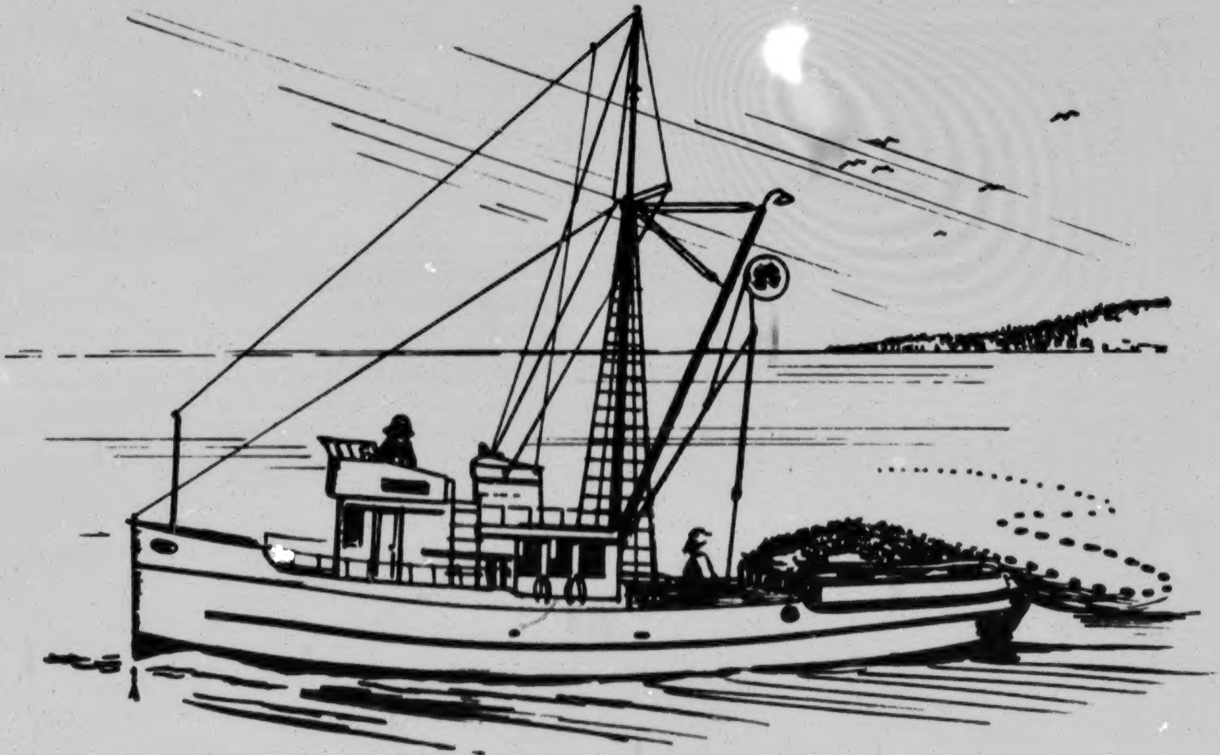
Five of the six species of Pacific salmon provide nearly 60 per cent of the commercial fisheries in this state: sockeye, chinook, pink, chum, and coho. Salmon are harvested by commercial fishermen for a variety of reasons. Their most important quality is their high protein content. In order to assure themselves of a valuable harvest year after year, the fishermen must pay close attention to the life cycle of the fish.



OCEAN
Natural Cycle
Hatchery Cycle
SOME ARE TRAPPED AND SPAWN TAKEN IN HATCHERY
ARE HATCHED IN TROUGHS OR TRAYS IN HATCHERY BUILDING
ENTER OCEAN

WHAT COMMERCIAL METHODS ARE USED TO CAPTURE SALMON?

Four basic commercial techniques are applied to salmon fishing off the coast of Washington and in Puget Sound: trolling, reef netting, gill netting, and purse seining. Until recently, the purse seiners caught about 80 per cent of all the salmon harvested in this state. The term "purse seine" actually refers to a 1,800 foot net that is towed by a 50 to 75 foot boat. Positioned in the water by a skiff to form a barrier almost perpendicular to shore, this "purse line" (line and rings) gradually closes the bottom of the net as the boat completes a circle. Trapped beyond escape, the fish are hauled in as the net is drawn closer together. About twenty minutes is needed to complete this process, and the catch can be as small as one or as large as 6,000 salmon in one haul.

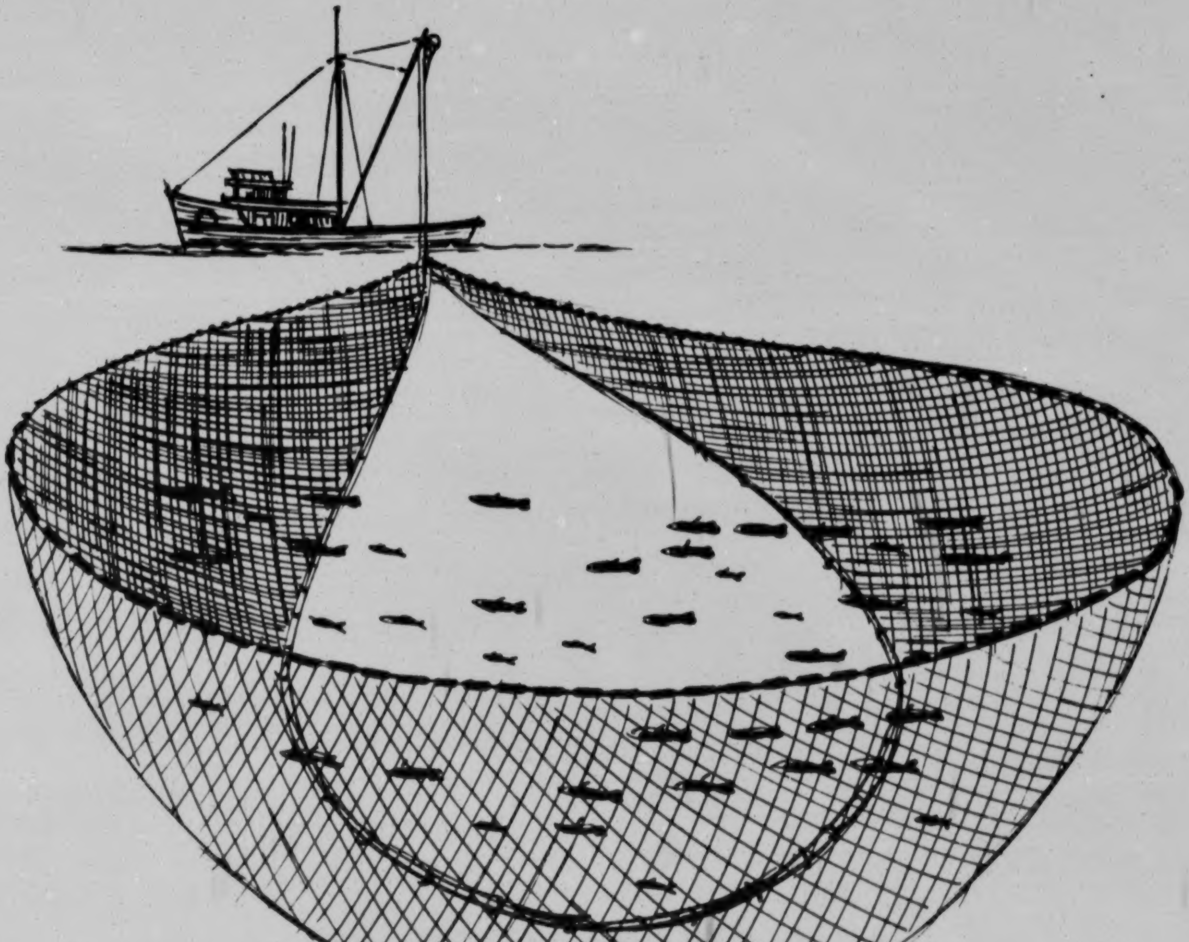


CAN PURSE SEINERS FISH YEAR 'ROUND?

Salmon management in Washington by the Department of Fisheries encourages the capture of the largest possible amounts of fish. It also provides for an adequate escapement of salmon populations for the purpose of stock renewal. It is for this reason, that seiners can only fish certain areas for specific kinds of salmon at definite periods of time. Length of nets, size of net mesh, and size of fish taken are also restricted. The overall season out of Puget Sound lasts about six months of each year.

An average crew for a boat is six fishermen: one skipper and boat owner, one cook, and four hands. A purse seining boat can cost anywhere from $60,000 to $180,000; the net alone is valued at about $10,000. Because of the large fixed cost of operation and the seasonal restriction, the seiners find that they must spend their remaining six months in Alaska fishing salmon and laying out crab pots.

There are a number of factors that influence the supply of salmon in the Pacific Northwest: adequate escapement from salt water to spawning grounds, cold fresh-water streams with gravel beds for spawning, pollution-free waters, and sufficient food. Minor disturbances with any of these factors can mean an expected depletion in the salmon run -- and a poor season for the purse seiners.



SUGGESTED ACTIVITIES FOR LESSON 9

1. **ACTIVITY:** Field Trip.

PURPOSE: To observe a salmon hatchery and note its contribution to fishery resources.

MATERIALS: Methods of transportation.

PROCEDURE: The following salmon fish protective and production facilities are among many that are open to the public for observation:

a. Soleduck Hatchery
b. Skagit River Hatchery
c. Samish River Hatchery
d. Kalama River Hatchery
e. Minter Creek Hatchery
f. Nooksack Hatchery
g. Issaquah Creek Hatchery
h. Skykomish Hatchery
i. Willapa River Hatchery
j. Hood Canal Hatchery
k. Simpson (Satsop River) Hatchery
l. Green River Hatchery

After making the proper field trip preparations and hatchery contacts, allow students to spend time visiting a salmon hatchery. Raise questions for discussion concerning the effectiveness of hatcheries and their necessity to the commercial fishermen.

2. **ACTIVITY:** Comparing "Food Fish" and "Game Fish."

PURPOSE: To help students understand the difference between "food fish" and "game fish."

MATERIALS: Pictures of aquatic life.

PROCEDURE: Have the students bring pictures from home (snapshots or otherwise). Discuss the difference between fresh and salt water fish, and then categorize the pictures according to their respective habitats. (This will probably be an opportune time for students to share their fishing experiences.) After thumbing through the pictures, determine what aquatic life the class normally sees on sale in the grocery store or at a fish market. What is caught and sold for market usually comes from marine or salt water -- this is called "food fish" (like salmon). "Game fish" are rarely marketed and are caught by individuals for family enjoyment or consumption.

SUGGESTED ACTIVITIES FOR LESSON 9 Continued

3. ACTIVITY:	Mapping Pollution.
PURPOSE:	To note the importance of clean waters for salmon.
MATERIALS:	Maps of Washington.
PROCEDURE:	Locate the list of rivers and creeks mentioned in Activity #1 on a map of Washington. (Desk size maps can be obtained free of charge from most neighborhood service stations.) Help the students list contributors to and causes of water pollution. If these rivers and creeks near the hatcheries gradually became polluted, what would happen to the young salmon? How would the purse seiners and other fishermen be affected?

LESSON 10: AW, SHUCKS!

CONCEPTS:	Commercial bedding and harvesting from Washington's coastline provides valuable shellfish as a food source.
TOPIC:	Oyster Farming
FOCUS:	Shucker, Bertie Sarver
LOCATION:	Willapa Bay, Washington
RELATED OCCUPATIONS:	Workers in Fish Market Workers Stringing Shells Workers Changing Oyster Beds Pickers Dredgers Collecting Oysters

BACKGROUND INFORMATION

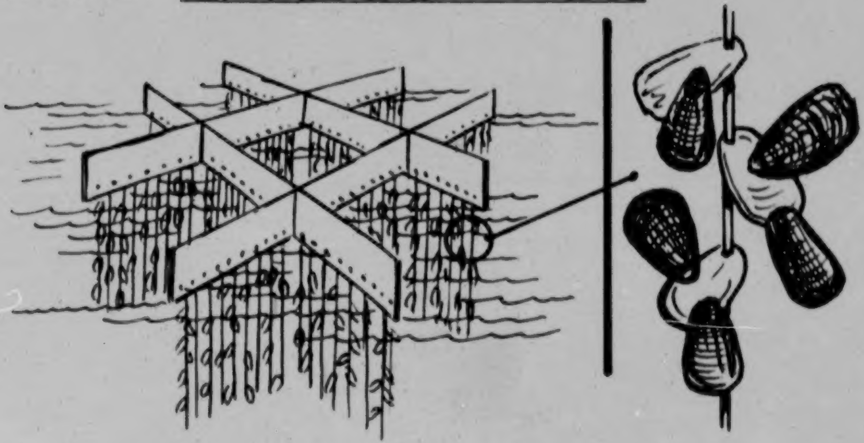
WHAT TYPES OF OYSTERS ARE HARVESTED IN WASHINGTON?

There is really only one species of oyster that is native to Washington -- the Olympic oyster. Small in size and sensitive to pollution, these oysters are becoming scarce. The oysters most frequently purchased by consumers are called Japanese or Pacific oysters. Because they do not reproduce well here, seeds are imported yearly from Japan to help keep up production. In 1969, about 5,750,833 pounds of oysters were harvested in Washington. The major locations include Willapa Bay, Puget Sound, and Grays Harbor. The largest contributor is Willapa Bay.

WHAT IS "OYSTER FARMING"?

Raising oysters on "farms" is by no means a new endeavor. Fishermen in ancient Rome raised their oysters on farms along the Italian coasts. Today, about 800 million pounds of oysters are produced in the United States - half of which come from undersea farms along the Atlantic Coast.

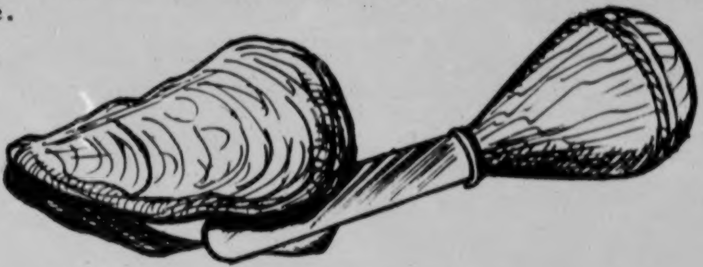
Farming is a year 'round process. After oysters are shucked or removed from their shells, the shells are hole-punched and strung together by a wire. The wire of shells is suspended from a wooden rack that sits in shallow water. Free swimming spats (hatched eggs) eventually attach themselves to these empty shells.



Crowded together, the young oysters continue to rapidly grow. At one month, an oyster is about the size of a pea. Four months after their birth, the wire strings are removed and cut, and pickers transplant the oysters in new bed areas for fattening. About three years and eight months later, a dredger harvests the oysters from the beds.

WHAT HAPPENS TO HARVESTED OYSTERS?

The oysters are taken from the dredger to the shuckers at the cannery. The cleaning tools are nothing more than a knife, a glove, an apron, and a bucket. The oysters are stabbed at the flat end of the shell, pryed open and released at the muscle.



The empty shells are used to repeat the farming process; the washed oysters are inspected, sorted for size, and then jarred or canned.

DO OYSTERS HAVE ENEMIES?

Farmers must compete with several natural and unnatural enemies of the oysters. The unnatural enemy, of course, is pollution. Because most of their existence is spent in one spot, oysters must depend on only their shells to protect them from natural enemies. Unfortunately, crabs, starfish, snails, and birds are capable of damaging the shells. Fish also swallow thousands of spats each year.

SUGGESTED ACTIVITIES FOR LESSON 10

1. ACTIVITY: Tide table.

PURPOSE: To learn how to read a tide table.

MATERIALS: Tide table obtained from local sporting shop, or the maritime section from the newspaper.

PROCEDURE: Make copies of a one month tide table for each student to observe, or make a sample copy on the blackboard. The arrangements of tide tables vary, some are in chart form and others resemble calendars.

Before explaining the table, discuss with students the meaning of the tides and what they might see on a salt water beach at different times of a day.

Sample table: November 17, 1971

HIGH				LOW			
AM		PM		AM		PM	
HOUR	FT	HOUR	FT	HOUR	FT	HOUR	FT
1:00	6.7	12:24	8.6	6:36	2.8	7:24	-0.5

There are two high and two low tides each day: high and low in the morning and early afternoon hours, and high and low in the later afternoon and evening hours. On the 17th, at 1:00 a.m., the tide is about 6.7 feet higher than the mean or average tide for that area. Six hours later, at 6:36, the tide is only down 2.8 feet from the 6.7 foot level. Another six hours passes by and about 12:24 in the afternoon, the tide reaches a low of 8.6 feet below the average level (not really very low!). By 7:24 that evening a -0.5 foot tide has been achieved; the minus indicates that the level is far below the average. Minus tides are generally the best time to search for oysters and other shellfish because the beach surface is relatively free of water.

2. ACTIVITY: Economics.

PURPOSE: To recognize and understand price variances with shellfish products.

MATERIALS: None.

SUGGESTED ACTIVITIES FOR LESSON 10 Continued

PROCEDURE: Most Pacific oysters are "raised" for commercial gain, and sell normally for about 90¢ a pint. Olympic oysters (the very tiny ones) are raised but becoming scarce (sensitive to pollution) and sell for about $8.00 a pint. Discuss these price differences and why they might occur. Bring a sample of each kind of oyster (or a picture of each) into the classroom for observation.

LESSON 11: ONE MORE TIME

CONCEPTS: Made from raw materials, glass containers are used for a variety of reasons.

To minimize the removal of these materials from the natural environment and to reduce pollution, used glass products are being reclaimed and reused.

TOPIC: Glass Making

FOCUS: Forming Operator, Jerry Gardner

LOCATION: Northwestern Glass Company, Seattle, Washington

RELATED OCCUPATIONS:
- Community People Collecting Glass for Recycling
- Furnace Operator
- Glass Inspectors
- Packers
- Weighing Station Operator

BACKGROUND INFORMATION

HOW IS GLASS MADE?

Glass products are basically composed of 73% silica (sand); the remaining 27% is limestone, soda-ash (sodium carbonate), and small quantities of other materials. Beginning with the melting operator, the proper amounts of the raw materials and crushed used glass are measured in weight and then added to a large mixer. Sent automatically into the furnace, the "batch" is exposed to 2,700°F for melting. The operator must keep a careful watch on the controls and the product to prevent defective glass. From the furnace, the molten glass passes through several steps until it reaches the "feeder." This is a trough-like channel with holes on the bottom, through which the material is pushed out to form "gobs." The gobs drop into molds where compressed air "blows" them into specific shapes.

HOW LONG DOES IT TAKE TO FORM A BOTTLE?

From furnace to mold, the process takes only 13 seconds! Riding on a conveyor belt from the molds through the gradual cooling tunnels, the bottles emerge about an hour later. (They have been sprayed with a protective metallic coating before entering and leaving the tunnels.) Before the new bottles are labeled or decorated and capped, they are carefully inspected by glass experts who check for defects.

WHY MASS PRODUCTION?

For hundreds of years, glass was made with a blowpipe. Skilled individuals dipped the end of their pipe into the molten material and a hot gob was shaped on a marble slab. Blowing through the pipe and turning it to shape the glass, a container was made. As time passed, a gob was blown into a mold. The process was still slow, though artful. As the demand for glass increased, so also was the time and expense minimized.

WHY SHOULD PEOPLE RECYCLE BOTTLES?

People are encouraged to return used bottles to reclamation centers for two basic reasons: to prevent that part of solid waste from adding to the pollution problem, and to conserve untouched natural resources by reusing already removed ones.

Recent statistics have shown that "the amount of solid waste created in the nation in one year would be enough to cover an area of 1,700 square miles, with refuse one foot deep." Of this accumulation, "each person is estimated to throw away an average of 188 pounds of paper, 250 metal cans and 135 bottles and jars per year." (Seattle Business Magazine, April 28, 1971)

Although glass is a very small percentage of a person's typical trash load, the total solid waste effect --- if not handled properly --- causes pollution on valuable land and wastes raw materials. For this reason, manufacturers and distributors of glass products and various other concerned groups are setting up reclamation stations.

At Northwestern Glass, one of the largest manufacturers in Washington, over 20% of as much as 550 tons of their daily manufactured glass is presently recycled.

WHAT ARE SOME OF THE POTENTIAL USES OF USED GLASS?

Old or used bottles and jars can be crushed and used in a variety of ways:

1. A new bottle can be remade with about 50% recycled glass.
2. Glass can replace limestone in pavement to form glasphalt.
3. A brick can be made with about 80% glass.
4. Glass wool can be made for insulation.
5. Reflective paints for signs can be made with crushed glass.
6. Sewer pipes can be made partially of glass.
7. Chicken grit can include ground glass to aid digestion of food.

SUGGESTED ACTIVITIES FOR LESSON 11

1. ACTIVITY: Survey.

PURPOSE: To help students realize the extensive use of and dependence on glass products.

MATERIALS: None.

PROCEDURE: Starting with their own kitchen cupboards, ask students to make a list of all the products in their homes that are stored in glass containers. Move next into the living room, bathroom, bedrooms, garage, and finally, outside the home environment, always adding to their list the different uses for glass containers. In class, allow students to share their lists and discuss the necessity of glass to them.

2. ACTIVITY: Bottle collection.

PURPOSE: To observe the variety of glass products and their characteristics.

MATERIALS: Bottles brought from home, transportation to museum.

PROCEDURE: Ask students to bring samples of bottles found in their home. After visiting a museum to see a collection of older bottles, have the students compare their sizes, shapes, thickness and color. Why, if any, have there been changes in any of these characteristics?

3. ACTIVITY: Recycling.

PURPOSE: To encourage the recycling of used glass products.

MATERIALS: Facility for storing bottles; transportation to recycling station.

PROCEDURE: Encourage the students to make a survey of the present litter conditions in their neighborhood. Divide the group into teams (maybe competition between classes). Allow the students to plan and carry through a clean-up campaign. The following facilities are available in the Puget Sound area as collection or reclamation centers for the students to deposit their glass findings. (Check your area for additional facilities.)

a. Northwestern Glass Company 762-0660
5801 East Marginal Way South
Seattle, Washington

SUGGESTED ACTIVITIES FOR LESSON 11 Continued

b. Health Sciences Building 543-0958
I Wing
University of Washington

c. Work Opportunities 778-5054
6515 - 202nd S. W.
Lynnwood, Washington

d. Smith Brothers Dairy MU 2-7633
27441 West Valley Highway
Kent, Washington

e. North and South Refuse Stations
Seattle, Washington

f. Certain local stores accept returnables.

Remind students to remove lids, caps, screw tops, and other metals from the glass products, and then separate them in boxes by color. (Labels can be removed or left on bottles and jars.)

LESSON 12: THINK BEFORE YOU DRINK

CONCEPTS: Water purification is a vital necessity to every community. An increase in population, products, and pollution has prompted the use of more complex methods to purify water.

TOPIC: Water Quality

FOCUS: Water Quality Control Plant Supervisor

LOCATION: Metro, Renton, Washington

RELATED OCCUPATIONS: Lab Technician

BACKGROUND INFORMATION

WHY THE CONCERN FOR WATER?

Large amounts of water are used by communities. In the United States, an estimated 28 billion gallons are used daily by the public for domestic and recreational purposes, 184 billion gallons by agriculture, and another 184 billion gallons by industries. Much of this used water is returned to its receiving lake, stream, or river in a polluted condition. What is pollution? Briefly, present-day pollution problems are caused by eight untreated sources: common sewage, and other oxygen demanding wastes, disease-causing agents, plant nutrients (increased amounts of nitrogen and phosphorous), synthetic organic chemicals (household detergents, pesticides, etc.) inorganic chemicals, and mineral substances (metal salts and acids), sediment, radioactive substances, and heat.

Regardless of the source, an increase in pollution means a decrease in water quality. Also, an increase in population means an increase in the demand for water supply.

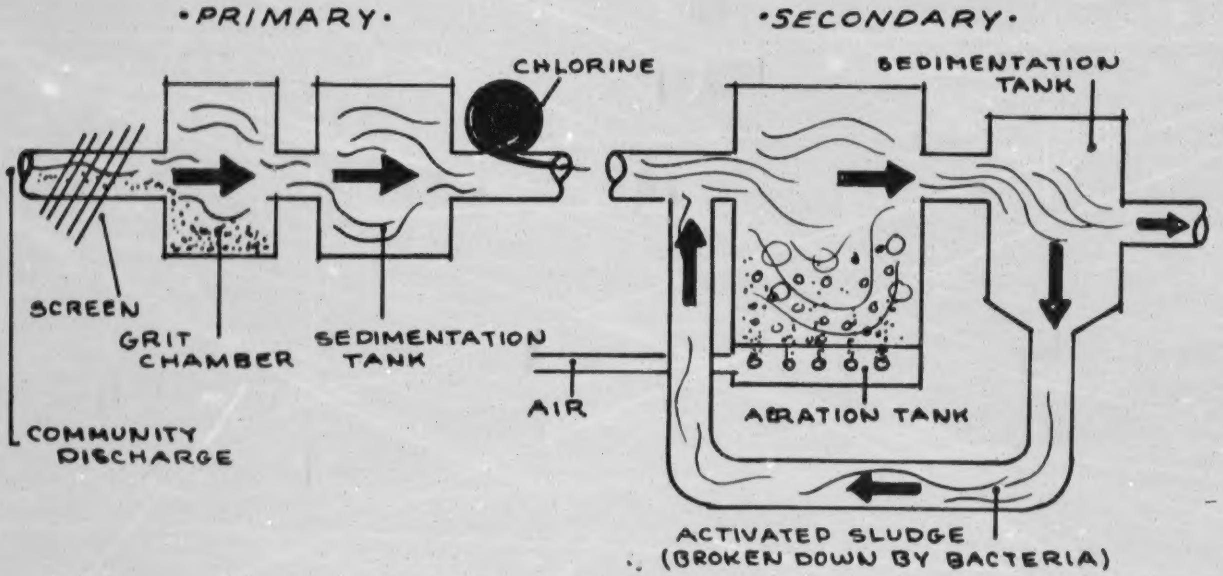
WHO IS RESPONSIBLE?

Water quality should be the responsibility of all persons who demand water! Community citizens, industries, agricultural groups, and all levels of government should be concerned and share in the efforts to correct and prevent. A variety of techniques are available to treat wastes, but communities are not developing or expanding their facilities fast enough to keep up with the increase in discharge. Among these available facilities are sewage treatment plants; discharge is piped from its source to the plant and fed through a series of tanks, screens and filters that help remove pollutants from the water.

WHAT IS A PRIMARY WASTE TREATMENT PLANT?

Many communities utilize primary treatment plants. Here, plant operators oversee the various stages of treatment and make frequent testings. At a primary plant, the incoming material that floats on the surface or settles to the bottom is removed.

The removed "sludge" can be put in a heated digestion tank, where the absorbed water is removed and the solid material is decomposed by bacteria. Dried sludge is often spread on land surfaces; it is incorporated back into the mineral cycles, only to be utilized again by living things. Dried sludge can also be added to an incinerator, and the ash is disposed of as land fill. Outgoing water is chlorinated before it is reused by communities. The effectiveness of a primary plant definitely depends on the size of the community, the rate and type of discharge, and the size and rate of flow of the receiving water.


•PRIMARY•
•SECONDARY•
CHLORINE
SEDIMENTATION TANK
SCREEN
GRIT CHAMBER
SEDIMENTATION TANK
AIR
AERATION TANK
COMMUNITY DISCHARGE
ACTIVATED SLUDGE (BROKEN DOWN BY BACTERIA)

WHAT IS SECONDARY TREATMENT?

Larger facilities are often used to meet the needs of a community. During secondary treatment, the sewage that passes out of the primary settling tank is pumped into an aeration tank. There it is mixed with air and sludge -- sludge highly active with bacteria. Several hours is usually needed for the bacteria to break down the organic matter. The sewage then passes on to another settling tank where the solids are removed; again, before returning to the receiving lake, stream, or river, the water is chlorinated.

Eventually, waste treatment plants might include: primary (removes settled or floating material), secondary (takes care of decomposable impurities), coagulation-sedimentation (eliminates suspended solids), carbon absorption (removes remaining dissolved organic material), electrodialysis (returns level of salts to water as it was before use), and chlorination.

Many cities in Washington are in need of secondary treatment or better. For financial and other reasons, primary facilities only are still widely utilized.

HOW EFFECTIVE IS METRO?

By 1961, Puget Sound was being flooded by 70 million gallons of raw sewage each day; over 20 million gallons of effluents were being dumped into Lake Washington. What treatment facilities were available, were not enough to meet the increase in population and demand. A campaign by Puget Sounders began in 1958 to wage an all out effort toward the growing crisis -- a campaign that gave birth to Metro: Municipality of Metropolitan Seattle. Underground sewage pipelines were constructed, many raw sewage outfalls were eliminated, new treatment plants were developed and older ones improved. As a result, the pollution rate in Lake Washington has been drastically reduced. Over 600 samples are collected weekly from the salt and fresh water areas to measure levels of oxygen, bacteria, etc. To make water quality a preventive rather than corrective action, present Metro treatment plants must continually be up-graded and everyone in the Puget Sound area should make it a constant effort to preserve and protect.

SUGGESTED ACTIVITIES FOR LESSON 12

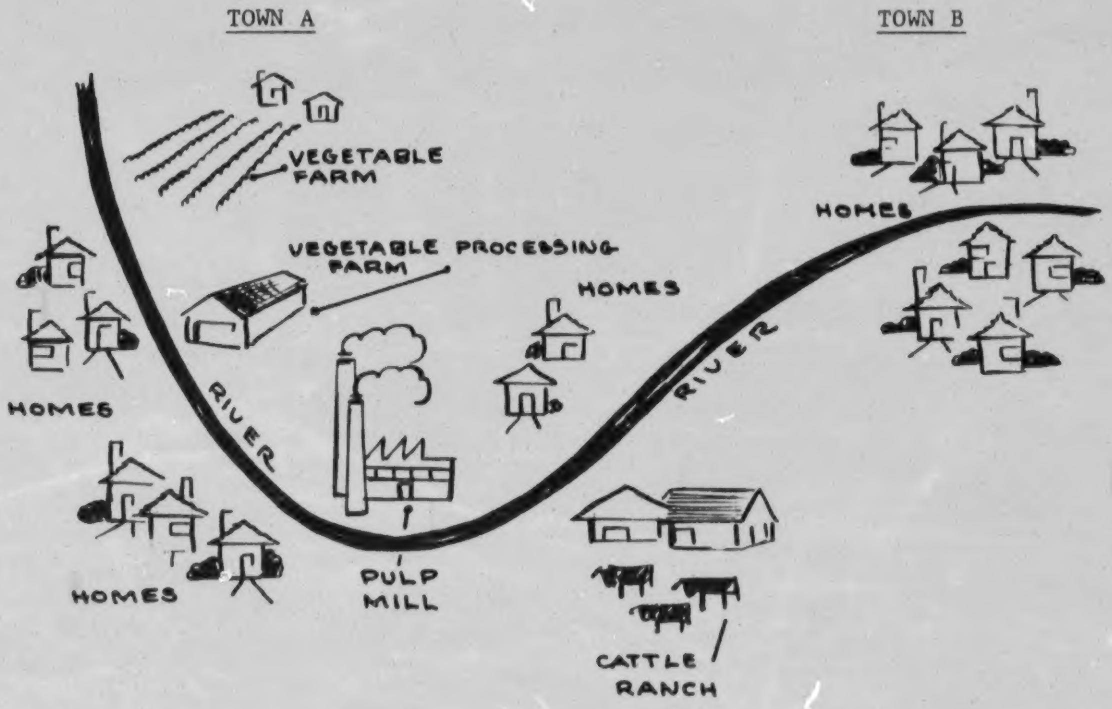
1. ACTIVITY: Financing.

PURPOSE: To help students determine who is responsible for treatment financing.

MATERIALS: None.

PROCEDURE: Describe a typical town to the class, including industries, farms and processing, residential areas, rivers and or lakes, etc. Present a situation of rising pollution and population and the need for better treatment of water.

For example:


TOWN A
TOWN B
VEGETABLE FARM
VEGETABLE PROCESSING FARM
HOMES
HOMES
HOMES
HOMES
HOMES
RIVER
RIVER
PULP MILL
CATTLE RANCH

Town B is complaining that their received water is of a poorer quality than that water received by Town A (same river). Town A realizes the need to purify their used water, but cannot decide how to finance a treatment plant. Role play town positions: mayor, cattle rancher, vegetable farmer, owner of processing plant, owner of pulp mill and towns people. Let the groups of students that represent these positions determine who should pay.

SUGGESTED ACTIVITIES FOR LESSON 12 Continued

2. ACTIVITY: Field trip.

PURPOSE: To better understand the function and operation of a waste treatment facility.

MATERIALS: Method of transportation.

PROCEDURE: Make arrangements to visit the nearest treatment facility in your area, eg: lagoon, well, primary or secondary or tertiary treatment plant. Encourage the students to discuss their observations and reactions. Raise questions to stimulate further discussion relating to effectiveness. If there is no method of treatment in your immediate area, discuss the reasons why.

LESSON 13: A STROKE OF GENIUS

CONCEPTS: An artist's work reflects his feelings. Some artists can communicate an awareness and appreciation for the environment.

TOPIC: Silk-Screening

FOCUS: Artist, Elton Bennett

LOCATION: Hoquium, Washington

RELATED OCCUPATIONS: Art Dealers
Customers

BACKGROUND INFORMATION

WHO IS ELTON BENNETT?

Since 1954, Elton Bennett has become a Pacific Northwest artist noted in all parts of the Nation for his hand printed correspondence notes and silk-screen prints. He grew up with a desire to be an artist, but spent some of his years working in a lumber and paper mill. He also enjoyed working on the water with a local dredging operation. He quit this job to attend the Museum Art School in Oregon for three years. He returned from this school to work in a machine shop. Finally, he was encouraged by his wife to do the kind of work he enjoyed most . . . art work.

He had an interest in the silk-screen media, and began making correspondence cards depicting local scenery. He was able to make multiple printings and sell them. With the success of these early printings, the Bennetts moved into a remodeled farm house in Hoquium, Washington. They still live there, surrounded by woods. Mr. Bennett works in an A-frame studio on the property producing large prints that are suitable for framing. His scenes reflect the Northwest area. Typical among these are mountains, forests, driftwood beaches, clam diggers, fishermen and their nets, and ferry boats.

WHAT IS SILK-SCREEN PRINTING?

The silk-screen process is an intermediary between painting (one finished product) and graphics (more than one finished product). It is an extension of the stencil process.

WHAT STYLE OF SILK-SCREEN PRINTING DOES ELTON BENNETT USE?

Mr. Bennett uses bolting silk. It is stretched tightly on a frame. The silk becomes the stencil. Mr. Bennett uses water soluble glue, and a draftman's pen or fine brush to make his picture. A separate screen is made for each color that is used. Special paint designed for silk-screen use, is forced into the paper through the open pores of the silk. This is accomplished through the pressure of a squeegee.

IN WHAT WAYS ARE MR. BENNETT'S PRINTS UNIQUE?

Elton Bennett's artistry is reflected in the charm and flavor with which he depicts the Pacific Northwest locale. Most of his work is done with three screens. No two pictures have the same color tone. His skies are not always blue. They may be red, or brown, or green. All these elements make Mr. Bennett's work readily recognizable and loved by many people.

SUGGESTED ACTIVITIES FOR LESSON 13

1. ACTIVITY: Observation and discussion.

   PURPOSE: To give students the opportunity to see silk-screen prints, especially Mr. Bennett's.

   MATERIALS: A variety of silk-screen prints. Try to include some of Elton Bennett's. If any of your students' families have some prints of his work, you might ask to borrow them.

   PROCEDURE: Give the students an opportunity to examine the silk-screen prints closely, noting different techniques that the artists have used.

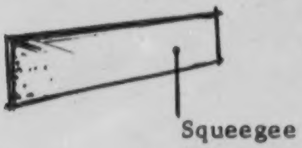
2. ACTIVITY: Screen prints.

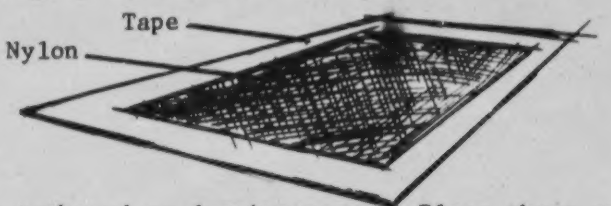
   PURPOSE: To give students a feel for the silk-screen process.

   MATERIALS: Heavy cardboard for frame and squeegee, masking tape, staples, nylon stocking (mesh won't work as well), tagboard or drawing paper to cut out positive/negative shapes, white drawing paper, tempera paint, liquid starch.

   PROCEDURE: Tape and staple part of a nylon stocking over a hole cut out of a heavy piece of cardboard. A shoe box lid works well.

   Make a cardboard squeegee, the width of the nylon.





   Cut out designs from tagboard or drawing paper. Place these on the background paper. Place the nylon frame over this.

   Mix tempera with starch and a little water to form a thick consistency. Place a glob of this paint mixture at one end of the frame. Holding the frame down tightly, use the cardboard squeegee to spread the paint mixture across the nylon a few times until paint is spread thoroughly. Lift frame. Lift tagboard designs. Let dry. This creates a negative design.

   Reverse the design procedure so that a positive design is printed. Cut out designs from tagboard, but put down the sheet that is left, not the actual cut-outs. Place this sheet on top of the white drawing paper, then place the frame on top of this, then continue with Step #4 of this procedure.

LESSON 14:	TO BE OR NOT TO BE
CONCEPTS:	Every child is a potential creator. Participation in the creative arts provides a means of enjoying and enriching life through experience.
TOPIC:	Children's Theatre
FOCUS:	Child Actor
LOCATION:	Children's Theatre Production, "House At Pooh Corner," Playbarn Theatre, Bellevue, Washington
RELATED OCCUPATIONS:	Director Author Composer Costume Designer Set Designer Make-Up Artist

BACKGROUND INFORMATION

WHAT IS CHILDREN'S THEATRE?

Geraldine Brain Siks defines children's theatre in her book, Creative Dramatics, An Art for Children. "Children's Theatre is . . . a group theatre experience in which each child participates vicariously as a member of an audience . . . The play, written by a playwright, is produced by the combined efforts and imaginations of a director, actors, and technical artists. In some children's theatre, the actors are adults, in others they are children. In either case they memorize the dialogue of the play, and are directed by a director who synchronizes the production."

IS IT EASY TO PUT A PLAY TOGETHER?

If a play has been prepared well and comes to us with a sense of ease and enjoyment, it is difficult to realize all the work that has gone into its creation. It takes teamwork.

WHAT KIND OF WORK DOES AN ACTOR DO?

An actor must enjoy using his imagination. He must be able to concentrate, read a script and memorize dialogue. He needs to understand the whole play, not just his character. The actors on stage are a team, listening and reacting to what is done and what is said.

LESSON 14: BACKGROUND INFORMATION Continued

WHAT OTHER WORKERS ASSIST IN CREATING A PLAY?

A director is a man or woman who has spent quite a few years studying drama and understands all the elements that go in to making a play. He interprets the play and guides actors, helping them block (how they will move, stand center, exit). He helps them understand their character, speak distinctly and interact with one another.

Technical assistants help in the creation of a play. Set designers design scenery for on stage. Set builders build the scenery. Artists paint the scenery and backdrops.

A stage crew moves scenery on and off stage during the performance. Lighting technicians are responsible for lighting the stage and can create different moods that help us understand the play. Make-up artists help transform actors so that they look the part. This takes a special skill, especially when the actors are portraying animals. Costume designers design and make the actors' costumes. A props man (or woman) is responsible for the articles that go on stage such as tables, chairs, and dishes. A stage manager is responsible for seeing that everything runs smoothly during the performance and that every actor is ready to go on stage at the proper time.

IN WHAT WAYS IS CHILDREN'S THEATRE IMPORTANT TO SOCIETY?

Participants utilize their creative energies, work as part of a group, and are involved in some of life's experiences. They provide entertainment and understanding for their audience. Actors in community productions may be pursuing an acting career. Often, the director and technical crew are paid for their jobs.

SUGGESTED ACTIVITIES FOR LESSON 14

1. ACTIVITY: Preparation of a play.

PURPOSE: Directed reading, group participation.

MATERIALS: Book (Winnie The Pooh or House At Pooh Corner).

PROCEDURE: Read one of the stories from A. A. Milne's, Winnie The Pooh or House At Pooh Corner. Set about to create a play using the different workers we have mentioned. Note the teamwork that is involved!

2. ACTIVITY: Informal creative dramatics session.

PURPOSE: Awareness through experience, teamwork, and critical thinking.

MATERIALS: None.

PROCEDURE: Prepare informally a creative dramatics session that requires only mental and physical involvement of the students. Choose a poem or short story that involves animal characters. Contrast this with a poem or short story that involves human characters. Note the different skills that are involved in the separate creations.

3. ACTIVITY: Food planning and preparation.

PURPOSE: Planning, teamwork, decision making, and fun.

MATERIALS: The Pooh Cook Book, and ingredients called for.

PROCEDURE: Find a copy of The Pooh Cook Book, by Virginia H. Ellison. It is a collection of over 60 recipes each with an appropriate quotation from Winnie The Pooh or House At Pooh Corner. There are many simple recipes that students could prepare in the classroom. You may want to incorporate parent participation for recipes that are more involved. Enlarging recipes will call for a little math know how!!

NOTE: Share some of the above creations with partner classes or with children in the younger grades!

LESSON 15: A STITCH IN TIME . . .

CONCEPTS: Proper clothing is necessary for protection from the environment during winter recreation.

TOPIC: Ski Jackets

FOCUS: Seamstress, Magi Yip

LOCATION: Pacific Trail Company, Seattle, Washington

RELATED OCCUPATIONS:
- Designers
- Fabric Cutter
- Assembly Line Seamstresses
- Store Buyers
- Salesmen
- Ski Instructors
- Ski Resort Employees

BACKGROUND INFORMATION

HOW LARGE IS THE APPAREL INDUSTRY?

In the United States, over one million men and women are involved in making clothing. It has been estimated that about $170 worth of clothes is made each year by the apparel industry for every man, woman, and child.

Included in this monetary figure are clothes bought to meet recreation needs; specifically, jackets. Pacific Trail, a large sportswear manufacturer in Washington, has apparel factories in Seattle, Spokane, and Wenatchee. (They also have one in Utah.) In Seattle alone, an average of 576 jackets are made every day. During the summer months, as many as 6,000 jackets are produced from all four factories. Considering the environment of Washington and the diversity in recreation, it is little wonder why the demand for sportswear is high.

HOW ARE SKI JACKETS MADE?

The manufacturing process begins with the designers. There are four basic sources from which a designer develops ideas: original creation (about 25%), basic or altered-basic styles, market trend (what is desired now) and fabrics that lend themselves to a particular look.

Once the sketches are approved by the management, a full-size master pattern is made on fibreboard. Usually a standard size 12 pattern is made and then passed on to a grading machine. The machine is capable of sizing the pattern up or down (eg: 8, 10--12--14, 16). Before meeting with cloth, the pattern pieces for each size are layed out on a table and traced. A photo is made of the copy -- shrinking the layout to 1/20 of its normal size!

LESSON 15: **BACKGROUND INFORMATION Continued**

The photo is used as a convenient guide to minimize fabric waste. Someone could fuss with the arranging of large pieces to decide on the best position. But the person who makes the pattern sheets could more easily glance at the photo and quickly determine the tightest placement of pieces.

Blueprints or photo copies are made of each pattern sheet and sent to the cutting room. After being carefully layed on a thick stack of material, the cutter operates an electric cutting machine. The related cut pieces are bundled together and are ready to begin the assembly line at the sewing machines.

WHY IS AN ASSEMBLY LINE USED?

Considering the expense of time, wages, and material that is involved in design, pattern making, cutting, sewing, and finishing (buttonholes and buttons, belts, pressing), each jacket could be valued at almost $150. In mass assembly, with everyone specializing in only a specific part of the jacket, the production time is cut and the rate of production is increased. As a result, the jacket can be sold at a reasonable price to the public for recreational use.

SUGGESTED ACTIVITIES FOR LESSON 15

1. ACTIVITY: Sewing.

PURPOSE: Understanding some of the time and skills required to sew a product.

MATERIALS: At least 3 jeans patterns and about 6 yards of very inexpensive cloth, pins, scissors, thread, needles (obtain from parent donation or through school funds).

PROCEDURE: Divide the class into working groups of no more than ten (try for small groups, if possible). Give each group the required materials for sewing. Without any instructions, and very little assistance, allow them to enjoy the frustrations of making a garment! Floor space should provide ample room to lay out their patterns and cloth. This project will probably take a good week, so storage space of each group's materials should be considered.

2. ACTIVITY: Recreation.

PURPOSE: To share experiences of recreational periods.

MATERIALS: None.

PROCEDURE: Initiate a discussion about recreation by sharing with the class one of your most exciting, unusual, or interesting experiences while enjoying the out of doors. After the students have had an opportunity to contribute to the discussion, change its focus slightly by talking about the clothing that should be worn to participate in the mentioned sports or places.

LESSON 16: A HOME AWAY FROM HOME

CONCEPTS: The mentally retarded are real people representing a significant minority of Washington's population. Homes for the mentally retarded should be used as training centers whenever possible, rather than dead-end institutions.

TOPIC: Home for Mentally Retarded

FOCUS: Teachers, Sheila Pera, Chris Anderson

LOCATION: Fircrest, Seattle, Washington

RELATED OCCUPATIONS: Students
Volunteers

BACKGROUND INFORMATION

WHY WAS FIRCREST HOME ESTABLISHED?

Fircrest opened its doors to persons seeking help in February of 1959. Its purpose at that time was to serve the state as a tuberculosis sanitarium. When the need for a sanitarium was minimized, Fircrest was partially transformed into a home for the severely mentally retarded --- a place for the unmanageable to wait out their days with others of their kind. Within these last four years, Fircrest has moved in an entirely new direction --- a trend vitally important to the mentally retarded. Its aim now is to stress the training of skills in these basic areas: domestic competence (being able to manage oneself), community skills (using telephone, riding bus, awareness of community facilities, etc.), and vocational aptitude (following directions, accomplishing some work at the center or in a community).

ARE THERE ANY ENTRANCE REQUIREMENTS?

Someone once said "Every man is like all other men; every man is like some other men; and every man is like no other man." At one time, persons were admitted to Fircrest on the basis of their IQ (70 is the considered deviation IQ for commitment). Today, prospective patients have their IQ's measured only upon entrance and exit of the center, and the scores hold little significance as a criteria for entrance. The new trend is to look at each person in relationship to himself and to his surroundings, and to test for adaptive behavior. That is, how well the family is able to care for the person considering his behavior, how well the community is able to offer support, and how well the person can adjust to his respective environments. Consequently, Fircrest has found that they can help train persons in their home situations as well as in residence (eighteen family situations, including parents and retarded child, are presently involved in home training programs).

DO MENTALLY RETARDED CHILDREN ATTEND SCHOOL?

As of July 1, 1971, there were 637 persons in residence at Fircrest Home; their physical ages ranging from 2 to 80. Of these, 250 are between the physical ages of infancy to 21. Forty-eight of this last group have been screened and enrolled in the "school" as a part of the new training program. The students begin each day in their classrooms at 9:00 a.m.; class size varies from one to five. Between 9:00 and 11:30, they study math, reading, writing, and language development. After lunch, they have art, music, and pre-vocational skill studies from 1:00 to 3:00. These lessons are interrupted with breaks or recesses of juice and games -- games that stress social interaction and consideration.

With a staff of one speech therapist and eleven accredited and non-accredited teachers, these students learn everything from cooking and gardening skills (plant and harvest own garden), to social skills (daily grooming, manners, etc.) to job skills (manipulation, operation, building patterns, and visual discrimination), to perception skills (coordination).

Their tools for learning include books, kitchen facilities, cash registers, a telephone switchboard, bean bags, balancing beams, paste, and tennis shoes (laces).

WILL THE STUDENTS EVER GRADUATE?

The ultimate goal of "the school" is to have students become capable of operating for themselves within the center, or at jobs in the center. Some students and trained adult patients will go on to group or foster-like homes and live for periods of time out of residence to help.

HOW CAN THE COMMUNITY BECOME INVOLVED?

Fircrest, like many other homes for the mentally retarded, cares for a large number of state supported patients. Volunteers at all ages are needed to act as sponsors -- providing patients with cards, presents and clothing. Someone once calculated that parents would have to have 281,474,976,710,656 children before they could duplicate the first. This exaggerated figure points to one conclusion --- there are no two living people alike; everyone is a unique individual. This of course, includes the mentally retarded, for they too need to be treated as real individuals.

SUGGESTED ACTIVITIES FOR LESSON 16

1. ACTIVITY: Collection drive.

   PURPOSE: To encourage students to accept the responsibility of helping persons in need.

   MATERIALS: Transportation, storage facility.

   PROCEDURE: Contact the nearest home for mentally handicapped persons and find out what materials they need for patients. If the list includes clothing, food or miscellaneous goods, encourage the class to collect these items from their neighborhood. Allow them to discuss why they should help!

2. ACTIVITY: "Big Brother" campaign.

   PURPOSE: Understanding the problems and needs of the mentally retarded.

   MATERIALS: None.

   PROCEDURE: Encourage a serious class discussion about the problems and needs of mentally handicapped persons. Ask them to compare their daily life to what they imagine might be the routine of a retarded child their age. If the class is inclined to help (it is important that they are not forced), let them participate in a "big brother" campaign. Contact a local center and ask them to select a child whose physical age is comparable to that of the students. Investigate his or her background and support the patient with birthday and holiday reminders, clothes, learning games, etc.

   Encourage the students to frequently share their ideas and feelings about the mentally retarded child they support. Discuss ways that they can help the patient progress.

LESSON 17: GREENHOUSE FOR PEOPLE

CONCEPTS: It is possible for a handicapped indivudual to grow, to learn, and to contribute to the community, if given the opportunity.

TOPIC: Social Rehabilitation

FOCUS: Goodwill "Worker of the Year," Martha Kelly

LOCATION: Goodwill Industries, Seattle, Washington

RELATED OCCUPATIONS:
- Supervisors
- Counsellors
- Volunteer Teacher
- Trainees in Sorting and Repair Process
- Choir Director
- Office Staff
- Truck Drivers

BACKGROUND INFORMATION

WHY WAS MARTHA KELLY CHOSEN "WORKER OF THE YEAR"?

Martha Kelly was chosen 1971 Goodwill "Worker of the Year" by her fellow workers in recognition of her continuous success in overcoming her handicap. Martha was born with a cleft palate and this defect has caused her embarrassment. She has a hearing loss, and limited education. These factors contributed to a lack of confidence, confusion, and nervousness.

Martha came to Goodwill in 1963. For two years, her job was to refurbish hats and operate the steam presser. With the help of her supervisor and counsellors, Martha learned to relax and understand that the part she played as a member of the Goodwill staff was an important one.

In September of 1967, Martha became an aide in the dining room. She is able now to do almost every job in the kitchen, including the preparation of a noon meal for approximately 500 people.

Martha continues to improve herself by attending classes in reading and arithmetic offered by Goodwill's Basic Education Program. She likes to sew for herself and her daughter. Her husband is retired.

HOW DID GOODWILL INDUSTRIES BEGIN?

Edgar J. Helms founded Goodwill in 1902. It was a depression time and Helms, a minister in Boston's south end, found the needy coming to him for clothing. Instead of letting this become a handout system, Helms came up with the idea of having some men collect materials, while others would have the opportunity to repair garments and furniture. He paid them for their labor out of the proceeds of the sale of articles to those who could afford to pay small amounts for them.

By 1910, Helms' vision enlarged to the development of this program in cities throughout our country. By 1924, thirty-five programs had been organized and the emphasis changed to helping the handicapped people to help themselves.

WHAT IS THE PHILOSOPHY OF GOODWILL INDUSTRIES?

In Seattle, the Goodwill Industries is a non-profit organization supported by sales of merchandise and private donations. Goodwill provides a "sheltered environment" for the handicapped, a place where they can learn and grow to the best of their abilities under the guidance and counselling of staff members who recognize their limitations but "accentuate the positive."

WHAT TYPE OF HANDICAPPED PEOPLE ARE EMPLOYED AT GOODWILL?

Five types of handicapped persons are helped in Goodwill's Workshops:

1. Physically handicapped
2. Mentally retarded
3. Emotionally handicapped
4. Socially handicapped
5. Over-aged

ARE THERE SOME WAYS THAT THE PUBLIC CAN HELP GOODWILL?

Trainees need materials to work on. The training program is paid for by profits from sales. A trainee will advance in his program to a point of graduation. At graduation time it is felt that he is ready to leave this sheltered environment to employment in regular industry.

SUGGESTED ACTIVITIES FOR LESSON 17

1. ACTIVITY: Discussion.

   PURPOSE: Check understanding of Goodwill program.

   MATERIALS: None.

   PROCEDURE: Have students tell a friend about the work being done at Goodwill.

2. ACTIVITY: Personal contribution to Goodwill.

   PURPOSE: Awareness through involvement.

   MATERIALS: Garments and small hard goods.

   PROCEDURE: Conduct a drive and collect articles to be used by the handicapped trainees in Goodwill Industries. If you collect a large number of items, you may want to call for a Goodwill truck to pick them up.

3. ACTIVITY: Field trip.

   PURPOSE: Awareness through experience.

   MATERIALS: Contact Public Relations office at Goodwill Industries.

   PROCEDURE: Arrange a field trip through Goodwill Industries. They do provide tours for schools and explain their program and show exactly what happens to items from the time they arrive by truck until they are placed on the floor for sale.

4. ACTIVITY: Discussion.

   PURPOSE: Critical thinking, better understanding.

   MATERIALS: None.

   PROCEDURE: Discuss the difficulties a handicapped person encounters in our society and what kind of responsibility we have as individuals to help the handicapped become useful citizens.

LESSON 18: WANT MY AUTOGRAPH?

CONCEPTS: The concern of a hospital is to restore health and encourage rehabilitation of patients. Cast making is an important role of a hospital's responsibilities.

TOPIC: Hospitals

FOCUS: Orthopedic Technician, Hugh Cochran

LOCATION: Children's Orthopedic Hospital and Medical Center, Seattle, Washington

RELATED OCCUPATIONS:
- Nurses
- Doctors
- Parents
- Therapists -- Physical, Occupational, Recreational

BACKGROUND INFORMATION

WHO IS HELPED AT CHILDREN'S ORTHOPEDIC?

Children's Orthopedic serves infants through twenty-one year olds. From the beginning, all children have been served, regardless of race, creed, or ability to pay. Originally, the hospital was established to care for children crippled by deformities. It now has enlarged in scope to provide complete medical service. Specialty clinics are held daily to provide for out-patient care.

WHO ARE THE WORKERS AT CHILDREN'S ORTHOPEDIC?

There are doctors, nurses, therapists, technicians and clerical workers. Community support is one of the unique strengths of the hospital. There are many volunteers who contribute their time and talents.

WHAT KIND OF THERAPISTS WORK AT CHILDREN'S ORTHOPEDIC?

Occupational therapists work on programs designed to strengthen their patients muscle power, increase their joint motion and coordination, and develop self-sufficiency in overcoming disabilities.

Physical therapists work to restore physical functions (exercise, walking, climbing stairs) in young patients and prevent disability from injury or illness.

LESSON 18: BACKGROUND INFORMATION Continued

Recreational therapists provide opportunities for patients to work on creative activities that may provide therapeutic exercise; at the same time they provide a creative outlet.

Inhalation therapists treat patients with respiratory problems.

WHAT DOES AN ORTHOPEDIC TECHNICIAN DO?

An orthopedic technician assists in the correction and prevention of deformities in children. Many times this involves applying and removing casts. Casts are applied when it is necessary to immobilize an area for bone correction. This application hastens healing. An orthopedic technician usually trains on-the-job under the supervision of orthopedic doctors.

HOW IS A CAST MADE?

Plaster of Paris is used to make casts. It comes in powder form already set in a cloth. These are in rectangular splints or rolls.

A cotton tape or lightweight stocking material is applied to the skin area first. If there is a chance of the cast slipping, a glue is sprayed on the skin instead, to hold the cast in place.

The splint or roll is wetted. Water temperature is crucial. When water and plaster of Paris combine, the chemical reaction produces heat. This is not too noticeable in thin casts, but in over thick casts the temperature can really rise during application. This requires skill on the part of the doctor and technician.

Each cast has a setting time . . . from the point at which the plaster is wetted to the point at which the cast has become firm. This varies from two to eight minutes. A cast dries completely at different rates, depending on its thickness. The drier the cast, the more strength it will have.

HOW IS A CAST TAKEN OFF?

That depends on its thickness. A thin, lightweight cast can be cut off easily. Thicker casts require the use of a small power saw with a round blade that can easily cut through thick plaster, although it makes a lot of racket when it does. The look and sound of this tool often scares young children.

SUGGESTED ACTIVITIES FOR LESSON 18

1. ACTIVITY: Visiting with a hospital worker.

   PURPOSE: To relate this world of work to the student's world.

   MATERIALS: Prepared questions for the guest.

   PROCEDURE: Contact the public relations department of your local hospital or contact a resource person you know personally. Ask the students what they would like to find out. Formulate questions. Write them down. Present them to your guest before he comes for his visit so he can prepare. Different students can ask these questions on the visitation day.

2. ACTIVITY: Discussion.

   PURPOSE: Individual sharing of experiences.

   MATERIALS: None.

   PROCEDURE: Have youngsters who gave gone to the hospital or who have had casts put on, tell about their experience.

LESSON 19: TOMORROW'S WHEELS?

CONCEPTS: Air pollution, traffic congestion and loss of natural lands, caused by an increasing number of vehicles, presents a threat to the normal growth of metropolitan areas.

TOPIC: Rapid Transit

FOCUS: Monorail Operator, Max McMullen

LOCATION: Alweg System, Seattle, Washington

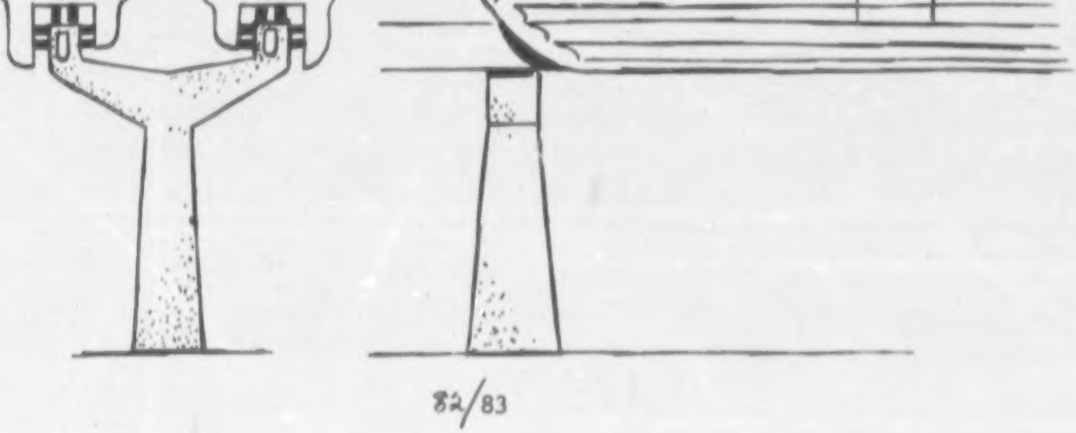
RELATED OCCUPATIONS:
Transportation Planners
Mechanics
Cashier
Guard
Passengers

BACKGROUND INFORMATION

WHAT IS A MONORAIL?

A monorail is a single rail or track designed to support a train -- a train capable of moving large numbers of people or large amounts of freight from one part of a metropolitan area to another. The monorial system can be traced as far back as 1821, when two rails were operated on the London docks. But the first system to be demonstrated as a means of mass rapid transit in an urban area was constructed in Seattle --- most commonly remembered as the Alweg Monorail at the 1962 World's Fair. The "Blue" and "Red" trains that are now owned and operated by the Seattle Center, ride on two nylon rubber tubeless tires filled with compressed air. Two additional tires press against the sides of the center beams for stability and guidance, with each of the two monorail trains moving on a total of 64 wheels.

The foundation of the electric powered transportation system is two sets of rails supported by "T-shaped" concrete pylons --- buried 25 feet in the ground and standing 25 feet above ground. The following sketches show a monorail system of the type built in Seattle.

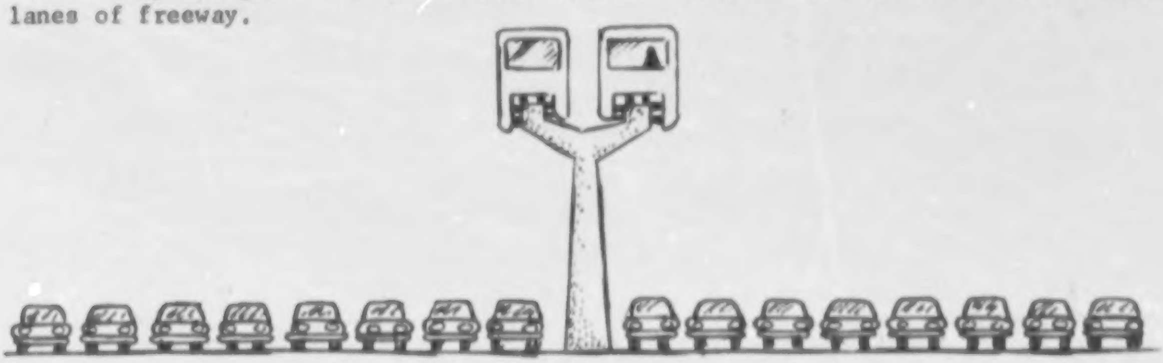


WHAT ARE THE RESPONSIBILITIES OF AN OPERATOR?

Chosen by the Seattle Transit System on the basis of seniority and training, the main function of the two operators is to drive the "Red" and "Blue" monorail trains 30 to 40 times a day. At the present time, the rails reach from the Seattle Center to downtown Seattle. An operator can make this point to point run in 1½ minutes, averaging 45 mph along the 1.2 mile long track. Each morning for an operator begins the same: a call to the dispatcher to make certain the train has been cleared by the mechanics, pick up his two working tools (brake handle and directional lever) and position them in their respective places at the head of the train, and finally start the train. In control of 100,000 pounds of machinery, this operator logs 25,000 miles yearly from the driver's seat and over 2 miles a day in walking. Walking? Definitely! Each train is reversible or can be driven from either end. A train departs from the Center for downtown and the operator drives from end A; upon arrival the operator walks to end B and departs for the Center again.

WILL THERE EVER BE MORE THAN THE "RED" AND "BLUE"?

The Alweg Monorail was originally constructed as a means of mass rapid transit to transport the large crowds at the World's Fair. Today, thousands of persons continue to ride the monorail trains daily, although the system has the ability to carry up to 10,000 passengers each hour. No plans are presently underway to expand the monorail system, but it definitely offers positive alternatives to present urban conditions. As the number of cars, trucks, and busses continue to increase, so also might the air pollution, traffic congestion, and loss of land to highways --- a discouraging outlook for any commuter of the future. Quick, clean, and economical (except for its long-term draw on electrical power), the pylons that support two trains spare only a four foot lane of street space. During a normal traffic rush hour, the monorail system is capable of handling the number of passengers that, if moved by automobile, would otherwise require 16 lanes of freeway.



The trend for the future in mass rapid transit is to operate above or below ground. Seattle's two operators and the "Red" and "Blue" may just be the beginning of an answer to transportation problems in metropolitan areas.

SUGGESTED ACTIVITIES FOR LESSON 19

1. ACTIVITY: Transportation Survey - I.

PURPOSE: To note the variety of vehicles used in the transportation of goods and people.

MATERIALS: Pencil and paper.

PROCEDURE: Have the students position themselves in a number of places in the community to observe traffic. Ask them to keep a record of the many types of vehicles they see. Allow them to compare their locations and types. Discuss the specific function of each of these types.

2. ACTIVITY: Transportation Survey - II.

PURPOSE: To note the volume of vehicles on the highway.

MATERIALS: Pencil and paper.

PROCEDURE: At different locations of the community, ask the students to record how many vehicles they observe in a 15 minute period. Allow them to compare locations with volume. Do the volumes vary? Why? Will the volumes vary more at different periods of the day? Different days of the week?

3. ACTIVITY: Transportation Survey - III.

PURPOSE: To note the number of passengers per vehicle.

MATERIALS: Pencil and paper.

PROCEDURE: Ask the students to observe the traffic in an area for 15 minutes, estimating and recording how many persons they see in each vehicle. Will these figures vary at different locations or different times of the day?

4. ACTIVITY: Transportation Survey - IV.

PURPOSE: To discuss the effects of vehicles in a community.

MATERIALS: Data from Surveys I, II, and III.

PROCEDURE: Recalling their collected data, allow the students to discuss the pollution problems in their area. Do the number and kinds of vehicles contribute to these problems? How? If the volume of traffic was high and the number of passengers per vehicle was low, what steps if any, should be taken in the community to encourage car pools or methods of rapid transit?

(Activities adapted from Sandy Walters and Larry Squire.)

LESSON 20: FACE LIFTING

CONCEPTS:	Increased development of land for highway use has been the direct result of increased vehicle traffic and the demand for better, more efficient facilities.
TOPIC:	Department of Highways
FOCUS:	Freeway Earthmover, Larry Mallula
LOCATION:	North Bend, Washington
RELATED OCCUPATIONS:	Engineers Draftsmen Truck Drivers Workers Laying Guard Rails Flagmen Highway Travelers (Commercial and Non-Commercial)

BACKGROUND INFORMATION

WHY ARE FREEWAYS CONSTRUCTED?

The number of vehicles using highways today is steadily rising with the increase of people in an area and their increased demand for goods and services. Because of the frequent utilization of this transportation system, safety and efficiency measures needed to be taken into consideration. As a result, a variety of wide highways, or freeways, can now be observed by-passing many populated areas.

WHO PLANS A FREEWAY?

The freeways seen in Washington are actually the responsibility of everyone - the Highway Department, the local and state governments, and the general public. The law requires: "Any state highway department which submits plans for a federal aid highway project involving the by-passing of, or going through, any city, town or village, either incorporated or unincorporated, shall certify to the secretary that it has had public hearings, or has afforded the opportunity for such hearings, and has considered the economic and social effects of such a location, its impact on the environment, and its consistency with the goals and objectives of such urban planning as has been promulgated by the community."
(Title 23; U. S. Code, Sec. 128)

When a proposal has been presented to make a major development in an area or a significant change in the existing highway system, the community involved should be very much aware of what is happening. Concerned groups (community, highway department, etc.) need to work together to discuss the basic problem and possible alternatives.

LESSON 20: BACKGROUND INFORMATION Continued

WHAT CONSIDERATIONS SHOULD BE EVALUATED?

Advantages and disadvantages must be carefully weighed before any decisions are made. Examples of concerns might include:

a. effects on water (eg: re-routing, pollution)

b. effects on air (eg: increased exhaust, noise impact)

c. effects on community (eg: aesthetics, economics, practicality, social adjustments)

d. effects on nature's systems (eg: disruption of migratory patterns, removal of habitats)

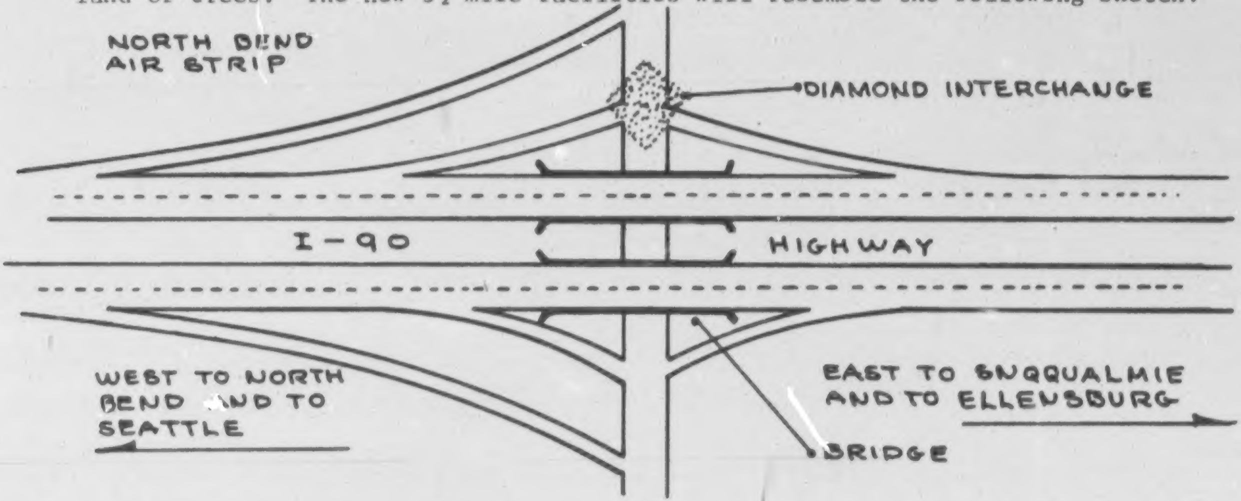
WHAT HAPPENS AFTER THE DECISION IS REACHED?

Once a plan or an alternative plan has been accepted by the Highway Department, bids go out to contractors to get the freeway built. A number of workers are necessary to accomplish this task: equipment operators (such as an earthmover for leveling), grade checkers, steel workers, carpenters or concrete workers and other skilled laborers. The weather plays an important role in determining how often these men can work. It is the responsibility of the contractor to make the disturbed area paralleling the freeway aesthetically appealing; usually, the slopes are grass seeded or trees are planted.

WHAT IS THE "LOWER-TANNER CROSSING"?

Contract 8914SRI90 is the official name for the freeway construction work at the "Tanner to the Lower Crossing of Snoqualmie River." The project began in October, 1970, and is planned for completion by Fall of 1974. The reason for the freeway between North Bend and Snoqualmie Pass was to make the existing road safer and to handle the increased volume of traffic (about 200 vehicles move in one direction each hour; this figure increases during the skiing season).

The present highway is four lanes wide, two directional, and separated by an island of trees. The new 3½ mile facilities will resemble the following sketch:


NORTH BEND AIR STRIP
DIAMOND INTERCHANGE
I-90
HIGHWAY
WEST TO NORTH BEND AND TO SEATTLE
EAST TO SNOQUALMIE AND TO ELLENSBURG
BRIDGE

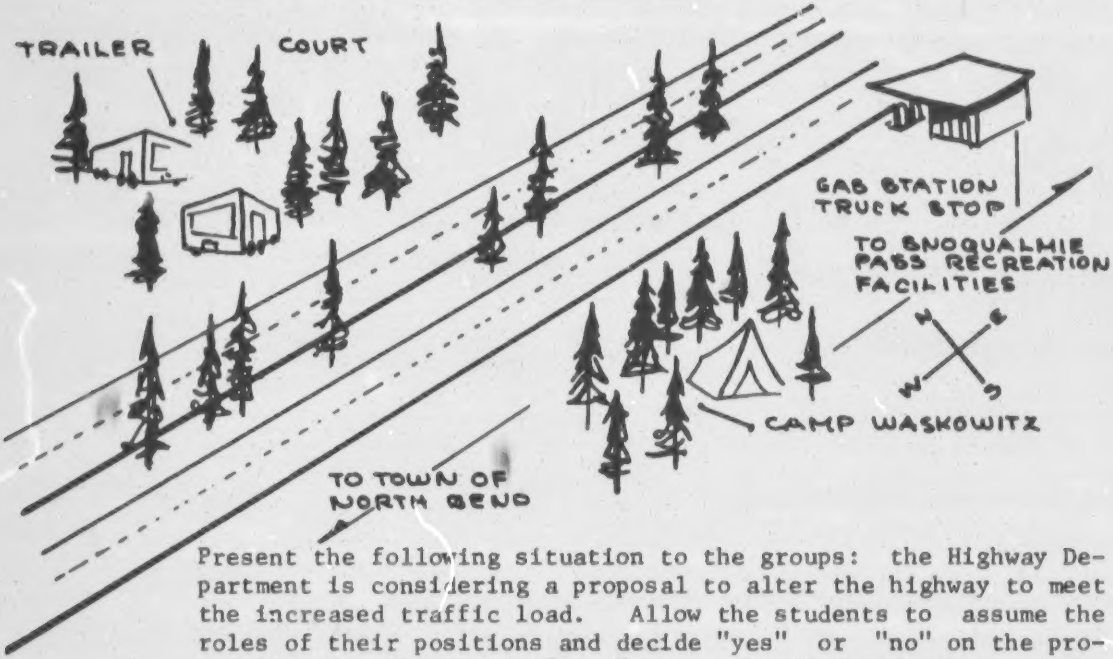
SUGGESTED ACTIVITIES FOR LESSON 20

1. **ACTIVITY:** Land management.

PURPOSE: To help students better understand the decision making process.

MATERIALS: Map of the community.

PROCEDURE: Make a copy of the included map for the students to study. Divide the class into groups: one group represents the Highway Department; another group represents the trailer park; another group is the gas station attendant; one group represents the skiiers. The last two groups represent the participants of the student camp and the town citizens.



Present the following situation to the groups: the Highway Department is considering a proposal to alter the highway to meet the increased traffic load. Allow the students to assume the roles of their positions and decide "yes" or "no" on the proposal. If they decide "yes," they should decide what is the best possible way for all involved - including the environment.

2. **ACTIVITY:** Responsibility.

PURPOSE: To encourage an environmental awareness of vehicle and freeway efforts.

MATERIALS: None.

PROCEDURE: Present the following statement to the class for discussion: "Highways do not pollute, it is cars that do."

LESSON 21: UP, UP, AND AWAY

CONCEPTS: Increased air travel has prompted the development of faster and larger methods of transportation.

TOPIC: Aircraft - 747

FOCUS: Crane Operator, Ferral Ivars

LOCATION: Boeing Company, Everett, Washington

RELATED OCCUPATIONS: Hookers (Floor Assistants to Crane Operator)
Assembly Workers for Exterior and Interior
Testers

BACKGROUND INFORMATION

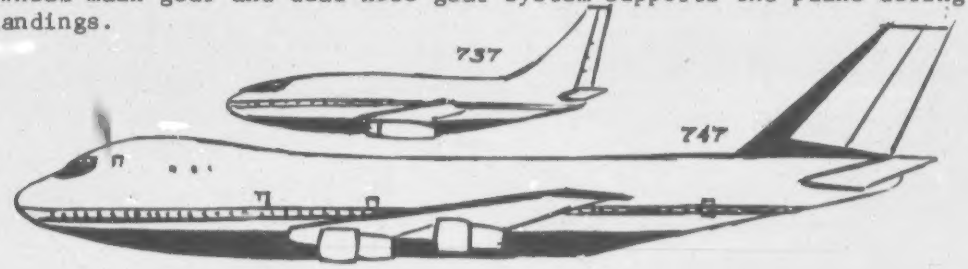
WHY WAS THE 747 BUILT?

Surveys and forecasts made in the early 1960's indicated a steadily expanding demand for air transportation through 1980 and beyond. In 1960 for example, 60 billion commercial passenger miles were recorded by free-world airlines. By 1970, that figure grew to 260 billion passenger miles. The predictions for the future include 520 billion by 1975, and about 920 billion by 1980. (NOTE: A passenger mile is the equivalent of one passenger traveling one mile.)

To meet this demand as well as the increasing amount of transported cargo, four types of 747's were designed for commercial use: the 747 (able to carry an average load of 374 passengers and baggage 5,900 miles non-stop); the 747B (able to carry more than 10 tons 4,000 miles); and the 747C (can be converted to carry passengers or cargo). Between January 21, 1970 and June 1, 1971, 135 747's were built and delivered to commercial airlines; 10,724,462 persons have flown on them as passengers.

HOW BIG IS THE 747?

The superjet is the largest jet airliner to be manufactured in the world. It more than doubles the passenger and cargo capacity of the earlier jet liners. Carrying a maximum of 490 people, the aircraft is 231 feet, 4 inches in length; 195 feet, 8 inches from wing tip to wing tip - nearly half the length of a city block! The jet flies as fast as 625 miles an hour, with a fuel capacity of 47,200 gallons (roughly the amount needed to run the average family car for approximately eighty years). A 16-wheel main gear and dual nose gear system supports the plane during take-offs and landings.



WHO MAKES THE 747'S?

The Boeing Company acquired about 780 acres near the Paine Field, Everett area during 1966. On this property they constructed the largest volume building in the world -- the manufacturing plant for the 747. The area set aside within the 200 million cubic foot complex just for riveting wing panels is larger than a standard football field. During 1967, over 20,000 employees began the manufacturing, subassembly, and final assembly of the first 747's. About 21 months is needed to build a 747, with parts coming into Everett from all over the United States (most of the major wing fabrication was once handled at the Auburn plant).

At the present time, airline sales have dropped, production has been minimized, and many employees have been laid-off. Some 4.5 million parts per 747 are still the serious concern of the remaining Everett workers. During the final two months of a superjet's birth, the two wings are joined to the center section. This unit is joined with the mid-section of the fuselage. Skilled crane operators then move additional airplane parts, such as the remaining body sections, the nose, and the tail, and lower them gently in place. Finally, nearly 125 miles of wiring is installed, flaps are added to the wings, and landing gear is attached to the belly. Once the jet is rolled out of the plant, pressurization tests and interior-exterior touches are added before it is checked for final ground inspections and flight tests.

DOES THE SUPERJET CONTRIBUTE TO ENVIRONMENTAL PROBLEMS?

An environmental awareness by the traveling public should emphasize convenience versus minimal use of all methods of transportation that emit pollutants or draw on large amounts of raw materials from the environment, such as fuel. Probably the only two methods of transportation that are not harmful to the environment are walking and bicycling. All other methods, if they are to continue, should include environmental controls.

The 747 was designed with new burner techniques that encourage a clean burning engine -- reducing the emission of carbon particle clouds. Also, because the plane is twice as large and carries over twice as many passengers as an earlier jetliner, it was intended that fewer aircraft would result in less pollution.

SUGGESTED ACTIVITIES FOR LESSON 21

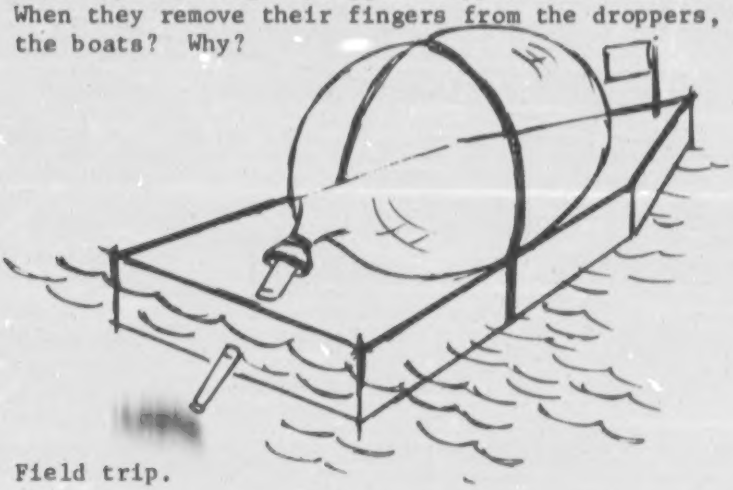
1. ACTIVITY: Jet propulsion.

PURPOSE: To help students understand how jet propulsion works.

MATERIALS: Plastic boats, medicine droppers, balloons, rubber bands, tubs of water.

PROCEDURE: Accumulate enough materials so the students can experiment in small groups. After removing the rubber part of the medicine dropper, have them insert the wide end of the dropper about 1" into the neck of the balloon. Secure it with the rubber band. Punch a small hole in the rear of the toy boat --- just large enough so that the dropper can be inserted. The balloon should lie in the hull of the boat and part of the dropper will be extended out of the aft section.

Students can blow through the dropper to inflate their balloons. Then lay the finger plugged dropper and boat into a tub of water. When they remove their fingers from the droppers, what happens to the boats? Why?



2. ACTIVITY: Field trip.

PURPOSE: To observe airplanes and the many people who are responsible for their operations and maintenance.

MATERIALS: Transportation to airport.

PROCEDURE: Plan a field trip to an airport of any size and make arrangements to tour the hanger areas, air traffic control tower, weather and flight service station (pre-flight checks), kitchen facilities, etc.

SUGGESTED ACTIVITIES FOR LESSON 21 Continued

3. ACTIVITY: Air pressure experiment.

PURPOSE: To help students understand the theory of flight.

MATERIALS: Thread spools, tagboard squares, straight pins.

PROCEDURE: Ask each student to bring from home an empty thread spool. After cutting and distributing small tagboard squares (about 2" x 2"), give each student a straight pin. The pin is pushed through the bottom of the square (centered) and hidden inside the spool.

Ask the students to blow hard into the spools - letting go of the square. The square should be suspended and not fall. Discuss why this happens and how it relates to airplanes.

NOTE: More rapidly moving air on top of card reduces pressure; the result is lift.

LESSON 22: HOT POT

CONCEPTS:	Copper is an important commodity to a community. The use of copper requires that it be extracted from mined ore.
TOPIC:	Smelter
FOCUS:	Converter Aisle Crane Operator, Harry Baddorf
LOCATION:	American Smelting and Refining Company, Tacoma, Washington
RELATED OCCUPATIONS:	Miners Ore Examiners Furnace Operators Chasers Tankhouse Personnel Meteorologist

BACKGROUND INFORMATION

WHAT IS SMELTING?

Smelting is a method by which metals are taken from their original ore. Smelting is done in specially built furnaces.

WHAT TYPE OF SMELTING IS DONE AT THE TACOMA SMELTER?

Asarco's Tacoma plant is the country's largest combined smelter and refinery. It has, at times, produced as much as 10% of the country's supply of refined copper.

WHY DOES COPPER NEED TO BE REFINED?

Copper occurs in nature primarily as a copper-iron-sulfur mineral. Before it can be used for electricity, transportation, plumbing, and many other uses, iron, sulfur and other impurities must be removed. This is done by roasting, smelting and refining. At the end of this process, 99.5 per cent pure metal will result.

WHAT IS THE PROCESS IN REFINING COPPER?

Ore is unloaded, weighed, sampled and crushed. All lots are chemically tested to determine value for which the supplier will be paid. From this point there are five steps in the refining process.

LESSON 22: BACKGROUND INFORMATION Continued

1. A furnace metallurgist determines the mixture of ores and concentrates that is made up in the fine ore bins. This mixture is conveyed to roasters and ignited with gas burners. This initial "roasting" removes part of the sulfur and prepares ore for Step #2.

2. The reverberatory furnace is a huge chamber 110 feet long, 28 feet wide and 12 feet deep with heat resistant brick walls. Fuel oil is ignited through burners at one end (25,000 gallons a day). The mass of material in this inferno is about 4½ feet deep and constantly molten. The ore mixture is fed into the top of the furnace and spread about on the surface where it melts at 2700°F. Matte, a heavy copper sulfide, settles to the bottom of the furnace.

3. Matte is withdrawn from the bottom of the reverberatory bath into 17-ton steel ladles and transfered by overhead crane to a converter furnace. Here the sulfur is burned off and the iron oxidized. This process continues until a melt which contains 98.7% copper is left.

4. The remaining impurities are removed electrolytically. This process is essentially one of electroplating in which pure copper leaves an anode and is electrically plated onto a cathode. Gold, silver, and impurities are left behind and settle to the bottom of the tanks as slimes. This process takes 28 days and produces grade copper of 99.9% purity.

5. The last step takes place in the refined casting department. The cathodes are melted and cast into wire bars or sheared into small pieces and shipped without remelting.

WHAT TYPES OF WORKERS ARE EMPLOYED IN A SMELTER?

Every step in the refining process requires a skilled worker. Examiners check the ore when it arrives. A furnace metallurgist prepares ore for "roasting." Tappers watch reverberatory furnaces determining when matte should be withdrawn. An overhead crane operator lifts the molten matte and transfers it. A crew of workers takes care of the electrolytic refining process in the tankhouses. Workers cast pure copper into wire bar shapes. Inspectors check the final product.

OF WHAT USE IS PURE COPPER?

Copper is best known for its ability to conduct electricity. It is also an excellent conductor of heat, making it useful in cooking utensils, radiators, and refrigerators. Copper can be hammered into unusual shapes without breaking or cracking. It can be drawn into thin wires and rods that withstand great stresses. Copper does not rust and is used for materials that touch water.

DOES SMELTING AND REFINING CREATE A POLLUTION PROBLEM?

During the smelting process, as molten ore is being reduced to pure copper in the furnaces, sulfur dioxide gas escapes and travels up the stack and out into the air. Excessive amounts of this gas contribute to the air pollution problem and if the gas settles closely to the ground, it will cause discomfort to the people in the Tacoma community. The smelter employs a full-time meteorologist to study daily weather conditions and, if he determines that the weather conditions will lead to a heavy concentration of the gas near the ground, then the smelter is shut down until weather conditions improve.

WHAT OTHER STEPS ARE BEING TAKEN TO CURB THE POLLUTION PROBLEM?

The people at the Tacoma Smelter are concerned about the effect the sulfur dioxide gas has on the atmosphere. They are working on solutions, trying to limit the amount of gas that goes into the air. They have been told by the Puget Sound Air Pollution Control Agency that they must cut down on these gas emissions by 90% by December 31, 1976. As a start on this, the smelter has agreed to go to work on the installation of equipment that will reduce the gas going into the air by 51%. This will cost them more than $14 million and must be completed by January 31, 1974.

SUGGESTED ACTIVITIES FOR LESSON 22:

1. ACTIVITY: Discussion.

   PURPOSE: Group participation, environmental awareness, critical thinking.

   MATERIALS: None.

   PROCEDURE: Provide this statement: "The Tacoma Smelter employs 850 workers." Open this for discussion. "What effects would occur in the local economy if the plant were to be closed or shut down for a period of time?"

2. ACTIVITY: Creative art project.

   PURPOSE: To explore some of the qualities of copper.

   MATERIALS: Copper wire.

   PROCEDURE: Have students create wire sculptures. You may want to suggest a theme or you may want them to create abstract sculptures.

3. ACTIVITY: Inspection of other metals.

   PURPOSE: To find out uses of other valuable metals, research, practical application.

   MATERIALS: Examples of aluminum, gold, iron, silver, tin, and zinc.

   PROCEDURE: Let students examine the metals. A committee may want to do some research to find out where the largest volume of these different metals originate. Students can research to find out how these metals are extracted from their ore state. From this point, discuss the important uses of these metals in production of everyday items. Examples of these products could be brought from home for a display table.

LESSON 23: HIDE AND SEEK

CONCEPTS: To prevent illegal entry and exit of materials and to maintain health standards, regular inspections are made at land, air and water ports.

TOPIC: Bureau of Customs

FOCUS: Inspector, Ken Holan

LOCATION: Seattle, Washington

RELATED OCCUPATIONS:
Duty Cashier
Longshoremen
Ship Crews
Dog Trainer
Personnel from the Department of Agriculture
Food and Drug Administration
Immigration Department
Public Health Department

BACKGROUND INFORMATION

WHAT IS A CUSTOMS INSPECTOR?

There are approximately 300 customs ports in the United States that require the services of inspectors. What do they inspect? Briefly, they must examine the millions of items that are exported out or imported into this country. Customs is a rather large and still growing business. In 1966 for example, inspectors processed over 192 million people and 57 million carriers (cars, trucks, planes, ships) that entered the United States. Accompanying these figures were 250 million tons of sea cargo and 200 million pounds of air cargo. By 1967, the entering population of people grew to 202 million! As public demands and methods of transportation continue to increase, so also will the work load for a customs inspector.

The examiner adheres to a fundamental law of customs during an inspection: if the merchandise is within the customs exemption allowed under law and if the owner or carrier has no prohibited items, the inspector will pass the merchandise free of duty (returning U. S. residents and arriving non-residents are usually allowed a personal duty-free exemption of $100); if the imported merchandise exceeds the customs exemption, duties are collected on the items in excess.

Because of the nature of the work involved, a customs agent usually has some training in police science and works closely with chemists, legal aides, and commodity specialists. In Washington, inspectors work out of 26 field offices for the Bureau of Customs.

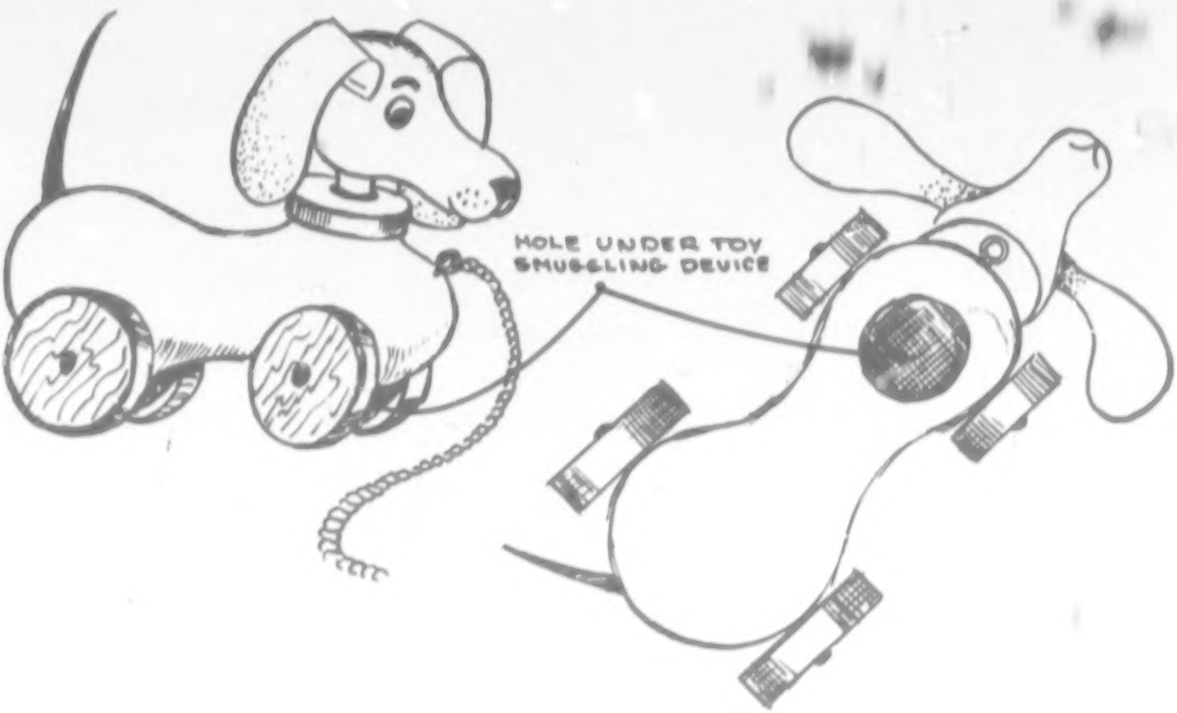
LESSON 23: BACKGROUND INFORMATION Continued

HOW DOES CUSTOMS AFFECT YOU?

A number of items enter and exit from U. S. land, sea, and air ports each year. Among these items are goods that require special permits -- permits received only after careful inspection. Such items might include:

- Animals (checked for ability to adapt to new habitat, breeding habits, disease, etc.)
- Certain drugs
- Cotton
- Cream
- Firearms and ammunition
- Fruits (checked for disease carrying insects)
- Meat and meat products
- Milk (checked for quality)
- Plants and plant products
- Vegetables

Obviously, such items will eventually effect the health and safety of any public recipient --- thereby warranting careful inspection. Many inspections made at customs ports are made for or with the assistance of representatives from the Department of Agriculture, Food and Drug Administration, Bureau of Census, Bureau of Foreign Commerce, Fish and Wildlife Service, Internal Revenue, and Bureau of Narcotics.



WHAT ARE SOME EXAMPLES OF ILLEGAL MOVEMENT?

A customs inspector must be alert for a variety of illegal entries and exits of merchandise. Examples might include smuggling (eg: diamonds inside toy doll or animal, heroin concealed in the scooped out pages of a book, stolen documents or money in a false bottom suitcase), fraud, the manipulation of foreign prices to avoid duties or taxes, movement of merchandise used to overthrow governments (eg: machine guns, mortars, etc.).

SUGGESTED ACTIVITIES FOR LESSON 23

1. ACTIVITY: Map study.

PURPOSE: To acquaint students with Washington ports.

MATERIALS: Maps of Washington (obtained from local service stations).

PROCEDURE: The following locations represent the 26 field offices for the Bureau of Customs in Washington. Incoming or outgoing international travelers must be inspected at or near these areas:

Port Angeles
Port Townsend
Seattle
South Bend - Raymond
Metaline Falls
Point Roberts
Aberdeen
Anacortes
Bellingham
Blaine
Danville
Lynden
Oroville
Everett
Ferry
Friday Harbor
Laurier
Spokane
Sumas
Boundary
Neah Bay
Night Hawk
Frontier
Olympia
Tacoma
Vancouver, B. C.

Help the students to identify these places on their map and discuss what type or types of ports each one might represent (air port, sea port, land port).

2. ACTIVITY: Importing animals.

PURPOSE: To further understand the need to inspect imported animals.

MATERIALS: None.

PROCEDURE: Ask the students to make a list of all the animals they can think of that live in homes. Beside each kind, identify its possible original habitat (eg: monkey from Africa). For those animals that must be imported from outside the United States, discuss the problems that might arise if they are not cleared through customs (eg: some people try to bring mongoose from India in as pets. They are prohibited from entering the U.S. because they ferociously attack natural wildlife; they also reproduce frequently).

LESSON 24: A WET BEAT

CONCEPTS: A police officer who patrols the water areas contributes to the safety and welfare of the community.

TOPIC: Police Department

FOCUS: Seattle Water and Air Patrol, Art Buchanan, Mike Allen, Fred Still, Don Potter

LOCATION: Seattle Police Department, Lak[illegible]gton

RELATED OCCUPATIONS:
Helicopter Crews
Patrol Boat Crews
Scuba Divers

BACKGROUND INFORMATION

WHAT IS THE HISTORY OF THE WAT[illegible]ND AIR PATROL UNIT?

Originally, the water patrol was run as part of the fire department. The police integrated with the harbor patrol. Now all staff go through police academy training.

Use of a helicopter started in 1960. When the police helicopter was crashed in 1968, the unit was without one until May of 1971. Presently a two-man copter is the "prowl car of the air." It is used around the clock. It covers 84 square miles of city and 200 miles of waterfront. Its top speed is 109 mph. It is equipped with lights that are bright enough to light up an entire city block.

HOW MANY BOATS DOES THE WATER PATROL USE?

The patrol uses five boats?

1. A 40' patrol boat works the waterfront and is the only diesel powered craft. Two patrolmen crew and trade off working as a skipper and as a deck hand. They go through a year of training and spend a 7½ hour day on the water.
2. Two boats are 34', have twin 250 hsp engines and travel at 30 knots.
3. One boat is 27' and is used as a fill-in boat.
4. There is a 21' enforcement boat called out in case of emergencies to help out other boats.

HOW MANY MEN WORK ON THE WATER AND AIR PATROL?

There is a full staff of 27 patrolmen during the summer months and there is an increasing demand for more personnel involved in year round surveillance. During summer, two boats patrol Lake Washington, two boats patrol Lake Union and one boat runs duty around the clock.

Six of the staff members cover the air patrol. There are three patrolmen pilots and three patrolmen observers. They rotate shifts making up a 16 hour day. The job of pilot and observer is much sought after.

An observer must have the experience of three years patrol duty on the street. He must be recommended by his supervisor as a highly qualified worker.

WHAT KIND OF WORKERS TAKE CARE OF THE EQUIPMENT?

The Water and Air Patrol take care of their own maintenance. Many of the skilled workers are police officers.

Crucial to pilots and observers is the police radio. There are two radios, both contained in the same unit in mid-front section of the helicopter. They are in easy reach for both men.

There are eight paid scuba divers on the staff. They go through diving training school on their own time, become certified and purchase their own equipment. They assist in underwater searches resulting from drownings and accidents. Divers have noticed an improvement in underwater visibility because of the Metro project to clean up Lake Washington and Lake Union.

DO THE OFFICERS WORKING FOR THE WATER AND AIR PATROL NEED SPECIAL TRAINING?

All the men working at the Water and Air Patrol are police officers and have successfully completed the 21 weeks of recruit training at the Seattle Police Academy. During this training, their subjects have included

- Communication skills
- Investigation of different crimes
- Police patrol techniques
- An understanding of city laws and roads
- Practical skills such as driver training, fire arms instruction, first aid and physical education
- Traffic law enforcement
- The understanding of people's behavior
- The ways of improving community relations (so that they and other citizens can work together)

LESSON 24: BACKGROUND INFORMATION Continued

After graduation, a police officer must work for three years as a patrolman "on the beat" before he can apply for placement in a special area such as the Water and Air Patrol, Traffic Enforcement, the Patrol Division, the Motorcycle Division, or special investigation such as narcotics, homocide, robbery or juvenile work.

SUGGESTED ACTIVITIES FOR LESSON 24

1. ACTIVITY: Committee work and reports.

   PURPOSE: Comparison of two valuable methods of water patrol.

   MATERIALS: None.

   PROCEDURE: Select four to six committees. Have them discuss and compare the assets of helicopter use and boat use for patrol and rescue. What advantages might one have over the other?

2. ACTIVITY: Map reading.

   PURPOSE: To locate the area served by the water and air patrol.

   MATERIALS: A city map of Seattle.

   PROCEDURE: Find Lake Union and the Water and Air Patrol Unit. From there, trace the waterfront area of Lake Union, noting the different spots of interest. Repeat this procedure for the waterfront area of Lake Washington. Include a tour of the 84 square miles of city that the helicopter patrols.

3. ACTIVITY: Discussion.

   PURPOSE: A clearer understanding of worker skills.

   MATERIALS: None.

   PROCEDURE: Discuss why it would be important for a patrol boat and helicopter to vary their routines and routes.

4. ACTIVITY: Decision making.

   PURPOSE: To establish some priority attributes for a skilled water patrolman (air and water).

   MATERIALS: None.

   PROCEDURE: Form groups to make lists or discuss as a whole group the physical and mental attributes necessary for a good water-air patrolman.

LESSON 25: BUILD A BETTER BOAT

CONCEPTS: Figerglas provides a long-lasting and durable product. Its use in boat construction requires workmen skilled in the total construction process.

TOPIC: Fiberglas

FOCUS: Mechanic, Jimmy Sutton

LOCATION: Ron Rawson, Inc., Renton, Washington

RELATED OCCUPATIONS:
- Fiberglas Laminating Crew
- Woodworkers
- Outfitting Crew
- Boaters (Commercial and Non-Commercial)

BACKGROUND INFORMATION

WHAT IS FIBERGLAS?

Fiberglas is a trademark associated with fiberglas reinforced plastics (FRP). It consists of micron strands of glass (a length the thousandth part of one millimeter) arranged in different directional strength patterns. When this glass combines with resin, a family of materials with a wide variety of performance characteristics results.

WHAT ARE SOME MAJOR PRODUCTS THAT UTILIZE FIBERGLAS IN THEIR CONSTRUCTION?

Transportation: Auto bodies, trucks, cabs and bodies, trailers, cooling system components.

Construction: Structural shapes, patio roofing, paneling.

Marine: Boats, ships, submarine hulls, floating docks.

Materials Handling: Pharmaceutical trays, industrial tote trays and boxes, food processing and delivery trays.

Electrical: Applications in transformers, motor, generators.

Sporting Goods: Fishing rods, archery bows and arrows, golf carts, golf clubs, water and snow skis, swimming pools.

Seating: Luxury office seating, school and auditorium furniture, lawn furniture.

LESSON 25: BACKGROUND INFORMATION Continued

Aerospace and Military:	Rocket motor cases, nozzles, nose cones, helicopter motor blades.

WHAT IS THE PROCESS INVOLVED IN CONSTRUCTING A FIBERGLAS BOAT AT RON RAWSON, INC?

The major large sections of each boat are formed in molds.

1. The hull mold creates the shape of the hull, the foundation of the boat. The first part of the hull to be made is the outside surface, and the first thing applied to the mold to create this surface is a colored gel coat. This glossy finish is applied with a spray gun.

2. Fiberglas fabric of different sizes and strengths is cut into designated patterns according to the style of boat being constructed.

3. The laminating crew then wets these fiberglas pieces with liquid resin and lays them, one piece at a time, on the hardened gel coat.

   Ron Rawson, Inc., uses a polyester resin which is a chemical combination of acid and alcohol. This resin could harden and shape the hull of the boat by itself, but joined with the layers of fiberglas pieces, it produces a stronger and firmer hull.

4. (For a power boat) The engine, as well as other lower mechanical equipment, is installed.

5. Top-side sections, such as decks, are put on. They too have been formed in molds.

6. The woodshop crew constructs inner parts, such as ledges and cabinets.

7. The outfitting crew takes care of the finishing stages, such as paneling, doors, windows, and drilling, to prepare the cabin for these and other items, such as stoves, sinks, and tables.

8. All power boats completed at Rawson, Inc., go through a test run on Lake Washington or the Puget Sound before they are delivered to the customer.

SUGGESTED ACTIVITIES FOR LESSON 25

1. ACTIVITY: Writing a list of fiberglas products.

PURPOSE: Observation, practical application.

MATERIALS: Pencil and paper.

PROCEDURE: Have students make a list of products found in their home that are made of fiberglas. List products found in the school room.

2. ACTIVITY: Distinguishing uses made of fiberglas products.

PURPOSE: To extend an awareness of fiberglas use in everyday life.

MATERIALS: Pictures of commercial fishing boats, sailboats.

PROCEDURE: Describe the work done by a commercial fishing crew. Describe different uses of sailing craft - sport racing, pleasure. Students may want to create a story with themselves as "skipper."

3. ACTIVITY: Science experiment to explain buoyancy.

PURPOSE: To find out why some objects float on water and others sink.

MATERIALS: Variety of objects, (paper clips, marbles, corks, balls, spoons, waxed cartons) tin cans, aluminum foil, can of water.

PROCEDURE: Sort objects. Let students determine weight by handling items. Place in light, medium or heavy piles. Test each group. What happens when each object is dropped into the water? Make a chart of which objects float and which sink.

Regroup objects according to size and retest. Does this make a difference? Drop a small tin can in the water. Test it in different positions. What do students observe? Remove can and crush it until it is flattened. Now drop it into the water. What happens? What property of the can has changed? What conclusions can students draw from this? (Weight of displaced water is significant in determining whether an object will sink or float.) Take a piece of heavy aluminum foil. Crush it until it makes a tight ball. Drop it into the water. What happens? Flatten out the foil. Make it into a small curved boat. Drop onto water. What happens? Include the terms "displaced water" and "buoyancy."

LESSON 26: IN AND DOWN, UP AND OUT

CONCEPTS: In the state of Washington, locks are constructed to link fresh water basins with marine waterways. Lock structures provide passage for vessels without offering considerable objection of the passage of migrating fish.

TOPIC: Locks

FOCUS: Locks Master, Jerry O'Leary

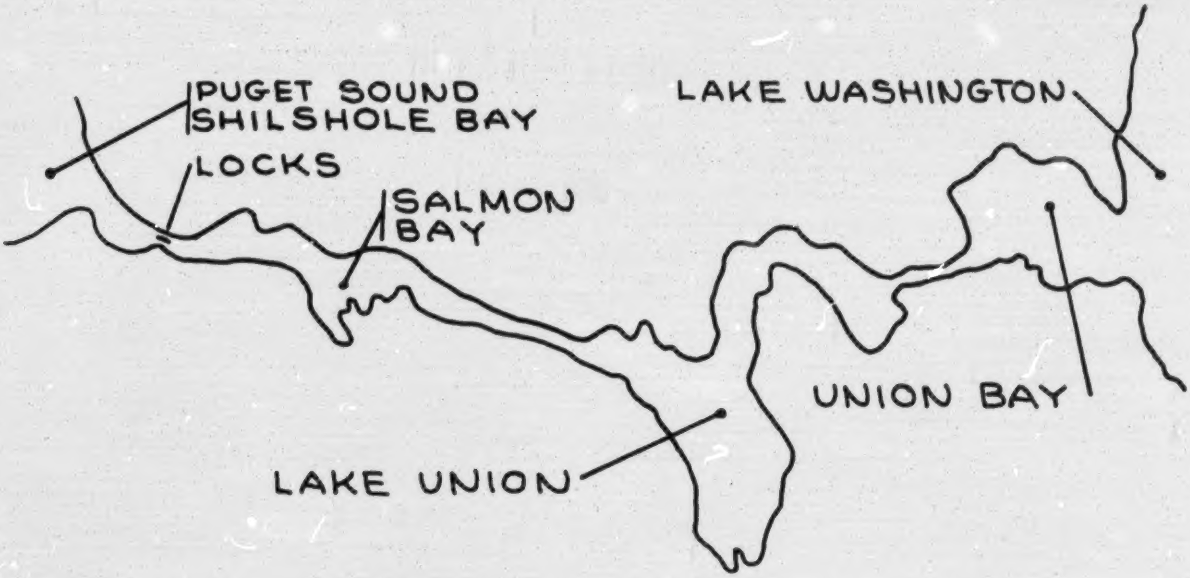
LOCATION: Chittenden Locks, Ballard, Washington

RELATED OCCUPATIONS: Locks Operators and Assistant Operators
Boaters (Commercial and Non-Commercial)

BACKGROUND INFORMATION

HOW DO THE LOCKS LINK SEATTLE TO THE SEA?

Suggested in 1853 and completed in 1917, Puget Sound was connected with Lake Union, Union Bay, Lake Washington, and Salmon Bay. These bodies of water now share the same level and are linked by free and obstructed navigable channels. Before the locks were built and the channels were dredged, each water facility had fluctuating elevations. Lake Washington's average level varied between 29 and 33 feet and it emptied into the Duwamish River; Lake Union's average level was 21 feet and it was regulated by spilling gates at its west end; Shilshole and Salmon Bays were only navigable at high tide and almost dry at low tide. A canal



was constructed at the beginning of Shilshole, making it accessible at all times and Salmon Bay and Lake Washington were raised and lowered respectively to equal the level of Lake Union. The Locks, one large and one small, help to preserve the newly established common level and prevent the tide from entering into Salmon Bay.

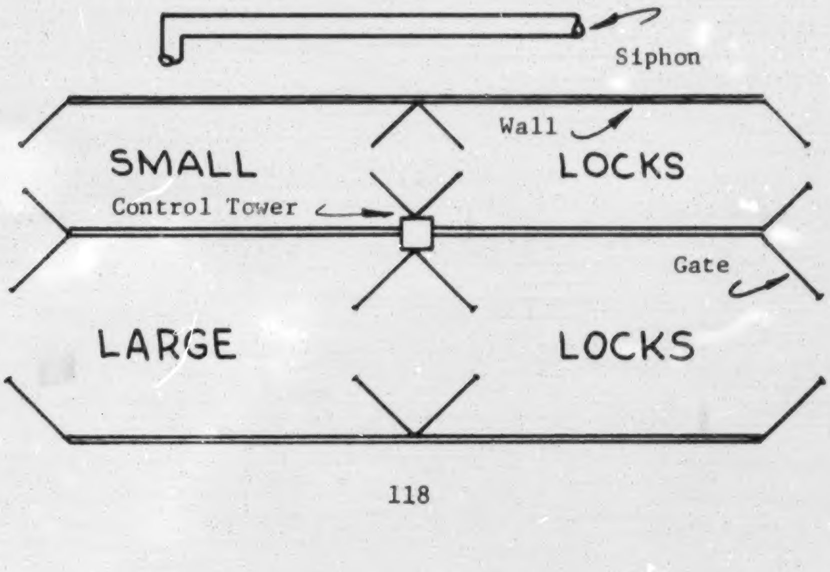
HOW OFTEN ARE THE LOCKS USED?

From the day it opened until 1968, approximately 2,700,000 vessels passed through the locks. These included pleasure crafts, fishing boats, tugs and barges and American and foreign passenger vessels. Hundreds of thousands of persons accompany these vessels each year, entering or leaving the lakes and bays via the locks. Detainment at the locks averages no more than 25 minutes in the large locks or about 10 minutes in the small locks.

HOW DOES THE OPERATOR CONTROL THE SYSTEM?

Functioning from a centrally located tower, the operator controls the opening and closing of both locks, the flow of water and the salt water barrier and the navigation control lights. With the aid of automated equipment for operation, he also relies on an intercom system and a television monitor system (located at the outer coast line of Shilshole Bay to spot size and number of incoming vessels.)

When a vessel approaches the canal from the fresh water side, the boat is halted by a wall that spans the width of the locks. The operator traps the high level fresh water and the boat in the chamber that is behind the wall by closing the inside locks. To compensate for the difference in density, some of the high level fresh water behind the wall is released into the salt water side. The level before and after the wall is now the same. Finally, the operator opens the wall and the vessel passes through the outer locks into Puget Sound.



DO THE LOCKS ENDANGER THE AQUATIC ENVIRONMENT?

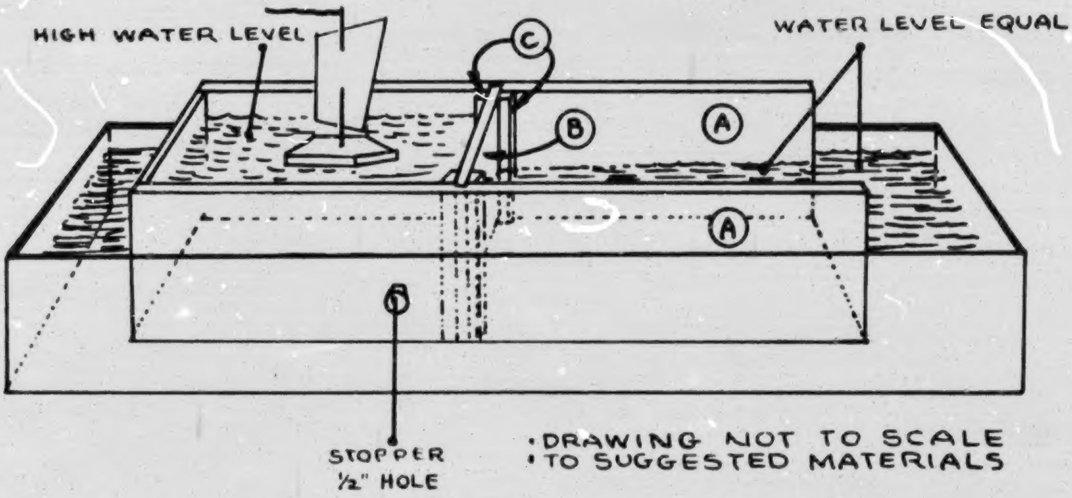
When the outside locks are opened for a vessel to pass into Puget Sound, the salt water tends to flow inward. But since salt water usually settles toward the bottom, a catch basin is provided; the salt water in the basin is siphoned back out of the lock area. This process is vital to preserve the delicate balance between the fresh and marine environments. The locks have thus far not hindered the migration of salmon from the sea to the lakes for spawning. Many of them navigate through the frequently opened locks, while others make use of the installed fish ladder.

SUGGESTED ACTIVITIES FOR LESSON 26:

1. ACTIVITY: Lock building.

PURPOSE: To help students understand the concept of fresh and salt water movement at the locks.

MATERIALS:
3 pieces of ¼" plywood, 12" x 4" (A)
2 pieces of ¼" plywood, 3½" x 3½" (B)
4 pieces of molding ½" x ½" x 3½" (C)
1 pan about 18" long and 6" to 8" deep
1 toy boat
1 rubber stopper
water



• DRAWING NOT TO SCALE
• TO SUGGESTED MATERIALS

PROCEDURE: Drill a hole large enough for the stopper on one of the sides about 1" from the bottom, as indicated by the diagram. Nail together the wood pieces (A = sides and bottom; B = one end and center gate; C = molding to hold center gate). The center gate should be removable!

Place the stopper in the hole, and then set the construction in a pan. Fill the pan with water so that outside and 1/2 of the inside of the construction are the same level. Fill the other 1/2 of the locks construction with water --- almost to the top.

Place a boat in the high level side. Pull the plug from the same side, so the two levels of water are slowly equalized. When one constant level is achieved, raise the gate and allow the boat to pass through the locks.

NOTE: The higher level represents fresh water; the lower level represents salt water.

SUGGESTED ACTIVITIES FOR LESSON 26 Continued

2. ACTIVITY: Personal experiences.

PURPOSE: To allow students to share their boating experiences.

MATERIALS: None.

PROCEDURE: Ask students if they have ever taken a boat ride --- many will answer yes, and surprisingly there may be a good percentage who will answer no. Inquire if any of them have spent time boating in Puget Sound, Salmon Bay, Lake Union, Union Bay or Lake Washington; for what purpose? Are there any students who have been through the locks in a boat; why? Allow plenty of time for them to relate their experiences in a class discussion.

LESSON 27: CRASH! BOOM! BANG!

CONCEPTS: Progress sometimes requires the destruction of out-dated structures, making room for newer facilities. Man is learning the necessity of foresight in the planning and building of cities.

TOPIC: Urban Planning

FOCUS: Demolitionist, Ron Iversen

LOCATION: Iversen Construction Company, Georgetown area, Seattle, Washington

RELATED OCCUPATIONS: City Planners
Additional Demolition and Clean-Up Crew Members

BACKGROUND INFORMATION

WHAT IS THE PURPOSE OF DEMOLITION IN CONSTRUCTION WORK?

A heavy structure or building may no longer be needed. It may be of no use or it may need to be destroyed to make way for an improved structure. The purpose of the demolition is to reduce the structure to its smallest volume by smashing it (or in some cases, blasting it) to rubble. The rubble is then taken to a dump.

WHAT KIND OF EQUIPMENT IS USED IN DEMOLITION WORK?

Heavy machinery such as cranes, bulldozers, and trucks are used. A wrecking ball or "headache ball" is most often used to do the smashing. This is maneuvered by a crane operator. Sometimes dynamite is used for blasting heavy structures that will not respond to the wrecking ball.

WHAT KINDS OF WORKERS MAKE UP A DEMOLITION CREW?

Laborers who work under labor jurisdiction and who are specialists in demolition make up the crew. There are men who operate bulldozers, drive trucks, and use cutting torches. Perhaps the most interesting job belongs to the crane operator. He must have good eye hand coordination and skill in precise handling of heavy equipment. He manipulates various pedals and levers to rotate the crane on its chassis and to raise and lower the crane boom and the load line. He must manipulate the wrecking ball attached to the crane boom.

SUGGESTED ACTIVITIES FOR LESSON 27

1. ACTIVITY: List the equipment and man power required for a demolition job.

   PURPOSE: Recall of information, critical thinking, writing skills, and group discussion.

   MATERIALS: None.

   PROCEDURE: You may want to precede the written portion of this activity with a group discussion. "What machines are necessary to demolish a large brick building?" "Describe the jobs necessary to man the machines." Preparation for writing may include spelling of more difficult terms on the board. Motivate the writing by suggesting that the student describe the machines and jobs to a friend by writing down the information.

2. ACTIVITY: Role playing.

   PURPOSE: Awareness through active involvement, critical thinking, recognition and statement of a problem, and group interaction.

   MATERIALS: None.

   PROCEDURE: Let students work as a team. They are to be city councilmen giving reasons why a building should be demolished, or why it should not be destroyed.

3. ACTIVITY: Discussion of a demolition job.

   PURPOSE: Group participation in critical thinking.

   MATERIALS: None.

   PROCEDURE: Describe how a demolition job is a team effort. Let youngsters discuss the impact of this by imagining what would happen if one member of the team did not do his part.

4. ACTIVITY: Discussion of skills involved in urban planning.

   PURPOSE: To help students become aware of the changes that have taken place in their community over a period of years.

   MATERIALS: Pictures of your community ranging from the year 1900 to the present day. As a source, check out your local historical society, newspaper libraries, and personal collections of students' families.

SUGGESTED ACTIVITIES FOR LESSON 27 Continued

PROCEDURE: Let students study the photographs, making their own observations of the differences they find. These differences may occur in almost all areas: personal appearance and styles, means of transportation, roads, kinds of buildings (including homes), style and design of buildings, etc. Develop the discussion around the questions, "Why have these changes taken place? Who has been responsible for this social and urban development?"

LESSON 28: **FOOD FOR THOUGHT**

CONCEPTS: Transportation of grain from Washington is necessary to food consumption in other parts of the world. Technological advancement and use of computers has changed the work emphasis at some grain terminals from that of manual labor to machine labor.

TOPIC: Grain Terminal

FOCUS: Computer Manager, Rudy Wahlen

LOCATION: Pier 86, Seattle, Washington

RELATED OCCUPATIONS:
Train Computer Operator
Inspectors
Ship Crew

BACKGROUND INFORMATION

WHAT IS THE PURPOSE OF A GRAIN TERMINAL?

The Port of Seattle's Pier 86 grain terminal provides for the storage, handling, and export of grain. The terminal operator is Cargill, Inc., the largest privately owned corporation in the world. They designed and built the Pier 86 terminal which opened in August, 1970. The primary grain handled and exported is wheat.

WHERE DOES THE WHEAT COME FROM?

Montana, North Dakota, South Dakota and Colorado provide the largest volume of grain. Washington, Idaho and Nebraska are other sources.

WHAT HAPPENS TO THE GRAIN AFTER IT IS BROUGHT IN?

90% of the grain comes in by railroad car and 10% comes in by truck. Each truck or car is weighed while full, then dumped and weighed again to determine the weight of the grain.

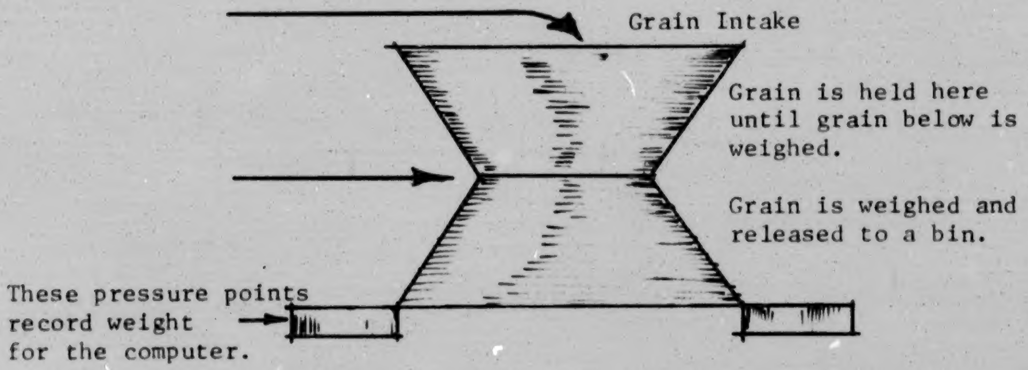
Five men work at unloading the boxcars and hoppers. They separate the grain according to quality. Longshoremen operate the controls that tip trucks and route wheat via belts to tanks in the silos.

WHAT KINDS OF WORKERS OPERATE THE GRAIN TERMINAL?

There are the men responsible for the initial unloading of the grain. From here, operations are handled completely by computer. Two men are computer operators. They have gone through a training program, and have learned how to handle and operate the computer.

WHAT CAN THE COMPUTER DO?

The computer weighs the grain and puts it in the correct bin. A bin holds 40,000 bushels or 1200 tons of grain. There is a computerized index card for each of the 99 bins. As grain is weighed and tabulated, a two-pound sample is taken from each weight load and sent for inspection to the grain lab.


Grain Intake
Grain is held here until grain below is weighed.
Grain is weighed and released to a bin.
These pressure points record weight for the computer.

WHAT HAPPENS WHEN IT IS TIME FOR THE GRAIN TO BE EXPORTED?

A man working within the grain elevator is notified. He dials the correct bin number and triggers this bin of grain for loading onto a waiting ship. This operation can also be done directly from the computer.

A stevedore team of seven men onboard the ship are responsible for the grain once it reaches the ship. They are employed by ILW Local 19.

WHERE WILL THE GRAIN GO?

The destination of grain out of the Port of Seattle could be any of these areas: Japan, Korea, Formosa, the Phillipines, India, Pakistan, all of Central and South America. The East Coast and Gulf Coast take care of the large volume of grain exported to Europe.

IS THERE A PROBLEM WITH POLLUTION RESULTING FROM GRAIN DUST IN THE AIR?

The Seattle grain elevators do not produce the volume of dust common to most facilities. There is some dust produced as grain is loaded onto ships for export. The dust is actually a part of the grain product that rubs off when large volumes are transported. It is high in protein and could be considered food. But since it does add to the many floating particles that are already in our air, the Port of Seattle and the Cargill Corporation spent nearly one million dollars on air pollution control equipment.

Doors and shields have been installed to confine the dust within the unloading areas and the dust is sucked from there into a storage bin. About every 10 days, the collected grain particles or dust are loaded on a tanker truck and sent to a feed lot in Oregon to be used for animal food.

WHAT HAPPENS IN THE GRAIN INSPECTION LAB?

The Grain Branch of the Department of Agriculture carefully weighs, samples, inspects, and certifies all grain entering trade channels in the State of Washington. They favor neither shipper or buyer. If grain is not up to standards, it is removed from food channels.

The process, briefly, includes these steps:

Wheat is divided in half. Half is used for grading; half is stored in case reinspection is necessary. The wheat is tested for purity and then for moisture content. A dockage tester removes foreign material such as weeds, dirt, etc. The wheat is then weighed on a gram scale to determine weight per bushel. A sizing machine tests for shrunken and broken kernels. A licensed operator grades the wheat. Grade data is typed up on official certificates. State certification of weight and grade is issued on every load of grain received or shipped out.

SUGGESTED ACTIVITIES FOR LESSON 28

1. ACTIVITY: Library research.

PURPOSE: To find out how wheat is harvested.

MATERIALS: Encyclopedias, related books.

PROCEDURE: Ask some students to find out the procedure used in harvesting wheat. (If you live in an area where this is done, look into the possibilities of a field trip.)

2. ACTIVITY: Food preparation.

PURPOSE: Close up look at a grain product, to gain skill in food planning and preparation.

MATERIALS: Proper facilities for cooking, ingredients for item to be prepared.

PROCEDURE: Form committees to decide on a practical grain product that they could prepare in the classroom. If facilities for cooking are not available to you, perhaps you could incorporate parent help so that a variety of products could be made at home by the students and brought to school.

3. ACTIVITY: Art project (collage or mural).

PURPOSE: To visually depict grain products and their uses.

MATERIALS: Old magazines.

PROCEDURE: Have students search through old magazines to find grain products. Prepare a class mural or collage . . . "grainstorming!"

4. ACTIVITY: Listing computer uses.

PURPOSE: Observation of technical advancement.

MATERIALS: None.

PROCEDURE: Have students list areas of work that are using computers in their operation. Proceed from here into a discussion of pros and cons about computer use. Sample questions could be: "How does computer use affect employment?" "Are there some kinds of work that you feel should never or could never be computerized?" "What kind of effect does computerized work have on personal communication and interaction?"

LESSON 29: WHO'S IN CHARGE HERE, ANYWAY?

CONCEPTS: Man can control the environment of animals beneficiclly by providing for their needs.

TOPIC: Zoo

FOCUS: Zoo Keeper, Gene Christe

LOCATION: Woodland Park Zoo, Seattle, Washington

RELATED OCCUPATIONS: Veterinarian
Animal Feeders
Food Suppliers

BACKGROUND INFORMATION

WHAT IS A ZOO?

The term "zoo" is short for Zoological Garden. A zoo is made up of a collection of different kinds of living animals. These animals live in cages or in open areas that look like their natural surroundings.

WHY DO WE HAVE ZOOS?

Zoos give people a chance to see live, wild animals in safe surroundings. Zoos also give Zoologists (scientists who study animals) an opportunity to learn about animal habits.

WHAT KINDS OF WORKERS ARE EMPLOYED BY A ZOO?

Among the workers you'll find at a zoo are the zoo keepers who are in charge of general animal care. At the Woodland Park Zoo in Seattle, Washington, it is the responsibility of zoo keeper Gene Christe to order and prepare the food that he delivers to the different animal units. The zoo keepers in the individual units are responsible for feeding the animals in their care.

Other workers at the zoo include the veterinarian, who is in charge of maintaining the health of the animals; the maintenance crews, who are in charge of maintaining the zoo grounds; and a clerical staff that helps the director with his correspondence chores. Some zoos may have a naturalist. This person is in charge of giving information to the community and to groups about animals.

HOW DO ZOOS GET THEIR ANIMALS?

Most often, zoos get their animals from animal dealers. These dealers buy the animals from hunters or even from other zoos. Sometimes zoos will trade animals.

SUGGESTED ACTIVITIES FOR LESSON 29:

1. ACTIVITY: Research.

   PURPOSE: To find out why some animals are becoming extinct.

   MATERIALS: Animal books and/or pictures, encyclopedia.

   PROCEDURE: Show some pictures of animals. Include a variety of well known and not so well known species. Discuss the reason why some animals are becoming extinct. Is this caused by nature or is this caused by man? Should something be done to curb extinction? Can something be done to curb extinction? If so, what? Include in the discussion man's use of some animal hides for clothes and accessories.

2. ACTIVITY: Placing animals in geographic location.

   PURPOSE: To show that various animals are found in different regions of the world.

   MATERIALS: Encyclopedia, large world map, pictures or cut-outs of animals being discussed.

   PROCEDURE: Students should choose a few animals that they want to do research on. In their study they should find out the part of the world that is the animal's natural habitat, what geographical features make this area conducive to the animals' well-being and what use might this animal be to the people of that region. When research is completed, a report can be made to the class. A visual aid to this report is a world map with a picture of the animal placed in his geographical setting.

3. ACTIVITY: Creation of zany animals.

   PURPOSE: To create a "personal zoo."

   MATERIALS: Paper, crayon, paint, clay (let students choose a media). Book, Dr. Seuss, "If I Ran The Zoo."

   PROCEDURE: Read Dr. Seuss' book aloud but without showing pictures. Write the names of some of his animal creations on the board. Let students create their version of what they think these animals would look like. Some students may want to create and name their own animals. Collect these animals to put in a "personal class zoo."

SUGGESTED ACTIVITIES FOR LESSON 29 Continued

4. ACTIVITY: Creative Writing.

PURPOSE: To develop a feeling for the animals in the zoo environment.

MATERIALS: Paper, pencil, perhaps a class-created list of the different kinds of animals found in the zoo.

PROCEDURE: This activity could develop in a few different directions. The students will write to answer the question "What yould you say if you were a ________ in the zoo?"

Students may choose to work in groups and concentrate on conversations of an animal family. They may want to attempt writing a simple poem to express their feelings. Some may want to write and develop a short skit about what it's like to be an animal in the zoo. Some may choose to express their feelings, as an animal, in the form of riddles -- a "Who Am I?" approach.

Sample animal conversations (from Program 29):

If I could talk for just one day,
This is probably what I'd say:
Please be my friend and not my foe,
'Cause just like you, I want to grow.

And I'd ask you to carefully plan,
Changes you make to this land;
For I need space if I'm to roam,
And call this place my "home sweet home."

Doin' my thing is important to me,
And just doin' what comes naturally;
But those aren't easy things to do,
If you leave your home to live in a zoo.

SUGGESTED ACTIVITIES FOR LESSON 29 Continued

Some zoos are just a place to stay,
But others are used in a better way.
For a zoo can help increase our kind,
And for our young a home they'd find.

Speaking of the zoo . . . I'm in here, too,
And I've got something to say to you:
Take the time when you come to see me,
To learn why animals need to be free.

LESSON 30: WE GOTTA WORK TOGETHER

CONCEPTS: Many workers contribute to the creation and development of a fifteen-minute educational television program.

TOPIC: Production of a "People At Work" Program

FOCUS: Channel 9 Staff

LOCATION: KCTS-TV, Channel 9, University of Washington, Seattle, Washington

RELATED OCCUPATIONS: None

BACKGROUND INFORMATION

HOW WAS THE "PEOPLE AT WORK" PROGRAM CONCEIVED?

A curriculum committee, made up of representatives from different school districts, suggested the need for a program dealing with occupational awareness and environmental concerns for intermediate students. Teachers from various school districts were notified as to the upcoming series and auditioned for the positions of television teachers. Each applicant presented a 15-minute lesson dealing with the subject area. These were video taped and viewed by the committee who made their selection of the two television teachers.

WHO THINKS UP THE IDEAS FOR THE ACTUAL PROGRAMS?

The television teachers are responsible for developing the curriculum for the series. This is done in the summer months. For the "People At Work" series, Tim and Lynn spent six weeks in the summer contacting the workers they had chosen for the series. This helped them gather information for the teacher's guide. They wrote the guide at this time, including background information on each job, suggested activities for the students, and suggested resources for teachers and students.

WHAT KIND OF WORK DO THE TELEVISION TEACHERS DO DURING THE SCHOOL YEAR?

The teachers have a 9 a.m. to 5 p.m. job, but often find themselves working extra hours in order to get some of the filming done.

It takes one week to put one show together and the programs are video taped two weeks before they are shown on the air. Preparation includes going out to the work spot with the photographer to film, planning and writing a script that will explain what the worker does, and selecting music to be used on the program, which in many cases has been written and recorded by the television teachers.

LESSON 30: BACKGROUND INFORMATION Continued

Cartoons are sometimes used to get thoughts and ideas across and these are drawn by the staff artist. These, as well as other still pictures, are shot into slides to be projected on the show.

When the film is processed, it has to be edited by the teachers. This means putting the film into the order and length that is required for the final program. The day of the taping is spent in rehearsal and sometimes in revision of the script, if need be.

WHO ARE SOME OF THE OTHER WORKERS WHO HELP IN PREPARING THE TV PROGRAM?

Secretaries	help in typing scripts, answering phones, sorting mail, and assisting at committee meetings.
Director	is responsible for overseeing the production of the program and directing the program, technically, from a control room above the studio.
Crew Members	assist in the technical production of the program. This may involve providing musical accompaniment for a recording and handling the recording equipment. Cameramen run the cameras during the taping of the program. An audio man sets the correct levels in the control room so that voices and music can be heard and recorded.
Engineers	work in the Master Control Unit to actually record the program on video tape and later play it back over the air so people can watch it on their TV monitors.

SUGGESTED ACTIVITIES FOR LESSON 30

1. ACTIVITY: Discussion: "Why People Work."

   PURPOSE: Critical thinking, group participation, and awareness of interdependence of people.

   MATERIALS: None.

   PROCEDURE: Use a discussion format to talk about these questions: "Why do people work?" "Why can people do different jobs?" "Why is this important?" "What are some important factors in choosing a job?" "Should a job mean more than 'just earning a living'?" "Why?" "Would you want the same jobs as those your parents have?" "Why?" "Why not?"

2. ACTIVITY: Career Day.

   PURPOSE: To personally visit with different workers and become aware of different jobs.

   MATERIALS: A listing of parents' jobs.

   PROCEDURE: Determine how many parents you want to participate. Contact them. Students can determine the format they would like to follow, questions they would like to ask, etc. All students can prepare the room for the guests.

3. ACTIVITY: Role playing the production of a show.

   PURPOSE: To give students a feel for the work involved in production of a show and the opportunity to work together.

   MATERIALS: Cameras, butcher paper, crayons, paints, tape recorders, music, etc.

   PROCEDURE: Go about the production of a classroom show about a person at work. Adapt the routine from Program 30 so that it will go along with the different media available within your building and classroom. Students may work individually or in groups.

APPENDIX

Program Music

Suggested Student Resources

Suggested Teacher Resources

Suggested Unit Work -- Occupational Clusters

PROGRAM MUSIC

Program music is provided for each lesson in this series for teacher and student use. Unfortunately, for copyright reasons, only the words to songs written by the TV teachers are included in this guide; cassett or reel to reel audio tapes of these songs are available by contacting KCTS-TV. All other music is available through local record stores.

MUSIC FOR LESSON 1 (Introduction to Series; Playground Equipment)

1. Theme Song: "Everyday People"

   Sly and the Family Stone
   Epic Records

2. "The 59th Street Bridge Song" ("Feelin' Groovy")

   Simon and Garfunkel
   Album: Parsley, Sage, Rosemary ahd Thyme
   Columbia Records

3. "The 59th Street Bridge Song" ("Feelin' Groovy") (Instrumental)

   Paul Simon
   Album: Paul Simon Interpreted
   Dot Records

4. "We Gotta Work Together"

   Tim Smith

MUSIC FOR LESSON 1 Continued

(Cassett or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

Take away the sunshine and the plants they will not grow,
There'll be no air for breathin' and no food for tomorrow.
'Cause I depend on the world, and the world it depends on me.
We gotta work together if we're to keep each other company.

Now take away the good land and the trees will not grow tall,
And put up lots of buildings and this world might soon look small.
'Cause I depend on the world, and the world it depends on me.
We gotta work together if we're to keep each other company.

Then take away clean waters and the fish will not be free,
And it won't be good for drinkin', now where does that leave you and me?
'Cause I depend on the world, and the world it depends on me.
We gotta work together if we're to keep each other company.

Now take away the giving and the people cry for more,
And take away the sharing and this world might turn to a war.
Then take away the people and the love in this world dies,
There'll be no chance for helping if no one cares or tries.
'Cause I depend on the world, and the world it depends on me.
We gotta work together if we're to help each other to be free.
Yes, I depend on the world, and the world it depends on me.
We gotta work together if we're to keep each other company.

MUSIC FOR LESSON 2 (Tree Farming)

1. Theme Song: "Everyday People"

2. "I Would Like To Grow"

Tim Smith

(Cassett or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

This world is new to me,
For I am young and free.
And you're a part of my first start
And all that I'm to be.
So treat me kindly,
Touch me gently,
Teach me things to know.
For I am now a part of life
And I would like to grow.

Please treat me kindly,
Touch me gently,
Teach me things to know.
For I am now a part of life
And I would like to grow.

3. "Deer, Oh Deer" (Tune: "Oh Dear, What Can The Matter Be?")

Lynn Severance and Tim Smith

MUSIC FOR LESSON 2 Continued

(Cassett or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

Oh Deer! What can the matter be?
Deer! Deer! What can the matter be?
Deer! Deer! What can the matter be?
Charlie come quick, take a whiff!

How could a dead fish be so far from the sea now?
My nose seems to twitch like a sneeze is real close now!
Could we get our dinner in some other place now?
We surely must get out of here!

Oh Deer! What can the matter be?
Deer! Deer! What can the matter be?
Deer! Deer! What can the matter be?
Pauline it's crowded in here!

There are lots of fine foods for us here in the woods now,
But Charlie, you know Douglas firs are the best now,
But maybe we need a new diet or change now,
That one tree has lost its appeal!

Oh Deer! What can the matter be?
Deer! Deer! What can the matter be?
Deer! Deer! What can the matter be?
Let's see how the other deer feel!

MUSIC FOR LESSON 2 Continued

That lady is spraying those trees so they smell now!
Could that mean she wants us to eat somewhere else now?
As long as we're still free to make this our home now,
I'm sure we can do things her way!

Oh Deer! What can the matter be?
Deer! Deer! What can the matter be?
Deer! Deer! What can the matter be?
We'll need a new treat for tonight!

(NOTE: Charlie and Pauline are the names Dr. Gauditz has given to two of her deer friends!)

MUSIC FOR LESSON 3 (Logging)

1. Theme Song: "Everyday People"

2. "Turn, Turn, Turn"

   Judy Collins
   Album: Reflections
   Electra Records

MUSIC FOR LESSON 4 (Smoke jumping)

1. Theme Song: "Everyday People"

2. "Follow Me"

MUSIC FOR LESSON 4 Continued

Mary Travers

Album: Mary

Warner Bros. Records

MUSIC FOR LESSON 5 (TV News Reporting)

1. Theme Song: "Everyday People"

2. "Easy To Be Free"

   Ricky Nelson

   ABC Paramount Records

3. "I'm Late" (from "Alice in Wonderland")

   Disneyland Records

MUSIC FOR LESSON 6 (Telephone Company)

1. Theme Song: "Everyday People"

2. "Reach Out And Touch Somebody's Hand"

   Diana Ross

   Album: Diana Ross

   Motown

3. Theme from "Popi"

   Ferrante and Teicher

MUSIC FOR LESSON 6 Continued

Album: Midnight Cowboy

United Artist Records

4. "Thank You Very Much"

Henry Mancini

Album: Love Story

RCA Records

MUSIC FOR LESSON 7 (Fruit Ranching)

1. Theme Song: "Everyday People"

2. "Give A Little Laughter"

Randy Edlemen

Album: Randy Edleman

Sunflower Records

MUSIC FOR LESSON 8 (Aqua Culture, Lummi Indians)

1. Theme Song: "Everyday People"

2. "El Condor Pasa" (Instrumental)

Nokie Edwards

Album: Nokie

Cream Records

MUSIC FOR LESSON 9 (Purse Seining)

1. Theme Song: "Everyday People"

2. "Draggin' the Line"

   Tommy James

MUSIC FOR LESSON 10 (Oyster Shucking)

1. Theme Song: "Everyday People"

2. "All Kinds Of People"

   Burt Bacharach
   Album: Close To You
   A and M Records

MUSIC FOR LESSON 11 (Glassmaking and Recycling)

1. Theme Song: "Everyday People"

2. "Cool Aid"

   Paul Humphrey
   Lizard Records

MUSIC FOR LESSON 12 (Water Quality)

1. Theme Song: "Everyday People"

MUSIC FOR LESSON 12 Continued

2. "The Numbers"

Tim Smith

(Cassett or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

My son come here and listen,
A story I'm to tell . . .
About a land and people,
The people I knew well.
Now heed the words I give you
For nevermore shall be . . .
The people and the land that
Once lived in harmony.

The people came and gathered,
Their numbers never ceased . . .
So many became the people,
That they lost their gift of peace . . .
For loving one another,
And learning how to care,
As more good people gathered
They found it hard to share.

And then their needs began to blossom,
But the land began to die . . .
The blue sky turned a sad grey

MUSIC FOR LESSON 12 Continued

And the rivers soon ran dry.
The people cried in anger . . .
Come help us if you can!
But the time was late for helping,
And died the people of that land.

My son there is a moral
To the story I have told . . .
Please tell it to your children,
Don't let the tale grow old.
The lesson is so simple
That a child could plainly see . . .
How the numbers are important
If the people are to be.

MUSIC FOR LESSON 13 (Silk Screen Artist, Elton Bennett)

1. Theme Song: "Everyday People"

2. "What a Wonderful World"

   Bobby Goldsboro
   Album: Bobby Goldsboro
   United Artist Records

MUSIC FOR LESSON 14 (Children's Theatre Production of "House At Pooh Corner")

1. Theme Song: "Everyday People"

MUSIC FOR LESSON 14 Continued

2. "House At Pooh Corner"

Nitty Gritty Dirt Band

(from the Liberty Album "Uncle Charlie and His Dog Teddy")

United Artists Records, Inc.

MUSIC FOR LESSON 15 (Sportswear Manufacturers)

1. Theme Song: "Everyday People"

2. "Everything Is Beautiful"

Ray Stevens

Epic Records

MUSIC FOR LESSON 16 (Teachers of the Mentally Retarded)

1. Theme Song: "Everyday People"

2. "He Ain't Heavy, He's My Brother"

Neil Diamond

Universal City Records

MUSIC FOR LESSON 17 (Work Training Program for Goodwill Industries)

1. Theme Song: "Everyday People"

2. "You've Got A Friend"

MUSIC FOR LESSON 17 Continued

Carole King

Album: Tapestry

Warner Bros. Records

MUSIC FOR LESSON 18 (Orthopedic Technician)

1. Theme Song: "Everyday People"

2. "Rhyme And Reasons"

Mary Travers

Album: Mary

Warner Bros. Records

MUSIC FOR LESSON 19 (Land Use and Transportation, Seattle Monorail)

1. Theme Song: "Everyday People"

2. "I'd Like To Teach The World To Sing"

New Seekers

Album: We'd Like To Teach The World To Sing

Electra Records

MUSIC FOR LESSON 20 (Highway Construction)

1. Theme Song: "Everyday People"

2. "A Part Of This Earth"

MUSIC FOR LESSON 20 Continued

Tim Smith

(Cassett or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

If you look around this place and a sense of peace embrace,
Or if you touch a hint of difference you'll find me.
For I am here and I am there, in this place most everywhere,
Look around, look around and you'll find me.

For I'm a part of this earth from each death to each birth . . .
From the flowing streams to the towering trees to the birds in the
  cooling breeze.
I'm a part of all that lives,
All that takes and all that gives.
A part of yesterday, tomorrow, and today.
A part of yesterday, tomorrow, and today.

And if within this place you find changes you have felt unkind,
Or if you're satisfied with the way things seem to be.
I answer only for myself, you must answer for yourself,
For you're a part of this place, too, and not just me.

For we're a part of this earth from each death to each birth . . .
From the flowing streams to the towering trees to the birds in the
  cooling breeze.
We're a part of all that lives,

MUSIC FOR LESSON 20 Continued

All that takes and all that gives,
A part of yesterday, tomorrow, and today.
A part of yesterday, tomorrow, and today.

MUSIC FOR LESSON 21 (Assembly of Boeing 747)

1. Theme Song: "Everyday People"

2. "Up, Up, And Away" (Instrumental)

   Charlie Byrd
   Columbia Records

3. "Jet Plane" (tune and words modified from "Leavin' On A Jet Plane")

   Lynn Severance and Tim Smith
   (Cassett or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

Movin' like the wind bird of silver wings,
So high you're travelin' seeing many things,
And is each flight you make a discovery?
From where do you come, and where do you go?
Who gave you this freedom, I'd like to know,
And how long will your secrets remain a mystery?

I want to fly away, free like a jet plane,
And be awhile 'til I come back again.

MUSIC FOR LESSON 21 Continued

Fly away, free like a jet plane,
And be awhile 'til I come back again.
Fly away, free like a jet plane,
Fly away, free like a jet plane,
Fly away, free like a jet plane.

Now my bags are packed and I'm ready to go,
The dawn is breaking and it's early morn,
And soon I will be wavin' you good-bye.
The time is now and the feelin' is right,
It won't be long before I'[illegible] out of sight,
And far above the clouds I soon will fly.

'Cause I'm leavin' on a jet plane,
Don't know when I'll be back again,
Leavin' on a jet plane,
Don't know when I'll be back again,
Leavin' on a jet plant,
Leavin' on a jet plane,
Leavin' on a jet plane.

MUSIC FOR LESSON 22 (Tacoma Smelter)

1. Theme Song: "Everyday People"
2. "Peace Train" (Instrumental)

MUSIC FOR LESSON 22 Continued

The Ventures

Album: Theme From Shaft

United Artists Records, Inc.

MUSIC FOR LESSON 23 (Customs Inspector)

1. Theme Song: "Everyday People"

2. "Games People Play" (Instrumental)

The Ventures

Album: The Ventures

United Artists Records, Inc.

MUSIC FOR LESSON 24 (Police Water and Air Patrol Unit)

1. Theme Song: "Everyday People"

2. "Joy"

Apollo 100

Mega Records and Tapes, Inc.

MUSIC FOR LESSON 25 (Fiberglas Boat Building)

1. Theme Song: "Everyday People"

2. "Cast Your Fate To The Wind"

MUSIC FOR LESSON 25 Continued

The Sandpipers

Album: Guantanamera

A and M Records

MUSIC FOR LESSON 26 (Locks)

1. Theme Song: "Everyday People"

2. "Locked In" (Tune: "Red Wing")

Lynn Severance and Tim Smith

(Cassetts or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

Ship:

Oh, 84 men one day,
All said, "Anchors aweigh,"
The captain, the crew, and the scientists, too,
As they passed into Salmon Bay.

Oh, 3 1/2 months they'd be,
Out in the open sea,
Workin' near Hong Kong and Taiwan,
Studying oceanography.

But no sooner were they bound,
When suddenly they found,

MUSIC FOR LESSON 26 Continued

Their ship was delayed,
In the locks they stayed,
On their way to Puget Sound.

Boat:

Like many boats that roam,
This one came cruisin' home,
At the end of the day it was
"Anchors aweigh,"
For the crew on the salty foam.

As their trip got near its end,
And Jerry saw them 'round the bend,
With a short delay, they would have to stay,
And be helped by this one friend.

As they came in they were low,
They took it nice and slow,
Once locked in tight,
They changed their height,
And homeward they did go.

MUSIC FOR LESSON 27 (Urban Planning and Demolition Work)

1. Theme Song: "Everyday People"

2. "The Brothers Theme"

MUSIC FOR LESSON 27 Continued

Mason Williams

3. "Down On The Corner"

Buddy Emmons

Album: Suite Steel

Elektra Records

MUSIC FOR LESSON 28 (Grain Terminal)

1. Theme Song: "Everyday People"

2. "Sunset Sound" (Instrumental)

"Nowhere Man" (Instrumental)

"Trumansburg Whistle" (Instrumental)

Gershon Kingsley and the Moog Synthesizer

Album: Music to Moog By

Audio Fidelity Records

MUSIC FOR LESSON 29 (Zoo and Animal Feeding)

1. Theme Song: "Everyday People"

2. "If You Could Talk To The Animals" (Tune and words modified from "Talk To The Animals")

Lynn Severance and Tim Smith

MUSIC FOR LESSON 29 Continued

(Cassette or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV)

If you could talk to the animals, just imagine it,
Hearing their opinions for a day,
Imagine listening to the animals, thinking with the animals,
Walking, talking, sharing with the animals,
What would they do, and think, and share and have to say?

If we conferred with our furry friends, man to animal,
Think of all the things we could discuss,
If we could walk with the animals, talk with the animals,
Grunt, squeak, squawk with the animals,
And they could squeak, and squawk, and speak, and talk to us.

3. "Ob-La-Di, Ob-La-Da"

Album: Age of Electronics (Synthesized on the Moog by Dick Hyman)
ABC Records

MUSIC FOR LESSON 30 (Planning a TV Show for "People At Work")

1. Theme Song: "Everyday People"

2. "The 59th Street Bridge Song" ("Feelin' Groovy")

Paul Simon
Album: Paul Simon Interpreted, The Sound Symposium

MUSIC FOR LESSON 30 Continued

DOT Records

3. "We Gotta Work Together"

Tim Smith

(See MUSIC FOR LESSON 1. Cassett or reel to reel audio tape of the words and music available for classroom use; contact KCTS-TV.)

SUGGESTED STUDENT RESOURCES

IRON FABRICATION

Books

Green, Erma. Let's Go To A Steel Mill, New York, G.P. Putnam's Sons, 1961.

Films

Steel and America

TREE FARMING

Books

Fenton, Carroll & Pallas, Dorothy. Trees and Their World, New York, John Day Co., 1957.
Gates, Richard. The True Book of Conservation, Chicago Children's Press, 1959.
Russell, Solveig. Trees for Tomorrow, Los Angeles, Melmont, Inc., 1959.
Selsam, Millicent E. Birth of a Forest, Evanston, Harper and Row, 1956.
Webber, Irma. Thanks to Trees, New York, William R. Scott, Inc., 1952.

Films

Animals at Work in Nature
Conserving our Natural Resources
Cultured Christmas Tree
Discovering the Forest
Forests
What is Ecology?

FOREST CONSERVATION

Books

Bennenson, Lawrence A. How A House is Built, New York, Criterion Books, Inc., 1964.
Colby, Carroll B. Tall Timber (U. S. Forest Service), New York, Coward-McCann Inc., 1955.
Dorbin, Norma. About Foresters, Chicago, Melmont Publishers, Inc., 1962.
Greene, Carla. I Want to be a Carpenter, Chicago, Children's Press, Inc., 1958.
Norling, Josephine. Pogo's Letter - A Story of Paper, New York, Holt, Rinehart & Winston, Inc., 1946.

Films

Conifer Trees of the Pacific Northwest

FOREST CONSERVATION Continued

Films

Conservation and Our Forests
Conserving Our Forest Today
Lumber States
Lumberman, The
Lumberyard, The
Paper
Paper and Pulp Making
Washington and Its Natural Resources

FIRE PREVENTION

Books

Colby, Carroll B. Park Ranger, New York, Coward-McCann, 1955.
Colby, Carroll B. Smoke Eaters, New York, Coward-McCann, 1954.
Hyde, Wayne. What Does a Parachutist Do?, New York, Dodd-Mead & Co., 1960.

TELEVISION NEWS

Books

Buchheimer, Naomi. Let's Go To A Television Station, New York, G.P. Putnam's Sons, Inc., 1958.
Greene, Carla. I Want To Be A News Reporter, Chicago, Children's Press, Inc., 1958.

TELEPHONE SERVICE

Books

Buchheimer, Naomi. Let's Go To The Telephone Company, New York, G.P. Putnam's Sons, Inc., 1958.
Batchelor, Julie. Communication From Cave Writing to Television, New York, Harcourt, Brace and World, Inc., 1953.
Kettlecamp, Larry. The Magic of Sound, New York, William Morrow & Co., 1956.
Tannenbaum, Harold. We Read About Sounds and How They Are Made, St. Louis, Webster Publishing Company, 1960.
Tooze, Ruth. Telephone Wires Up, Chicago, Melmont Inc., 1964.
Schneider, Herman & Nina. Your Telephone and How It Works, New York, Whittlesey House, 1952.
Yates, Raymond. The Boys' Book of Communication, New York, Harper's, 1942.

Films

Cities and Utilities: Our Public Utility System

TELEPHONE SERVICE Continued

Films

My Pop's A Lineman
How Does the Phonograph and Telephone Work?

FRUIT HARVESTING

Books

Stever, Dorothy. The Wholesale Produce Market, Los Angeles, Melmont, Inc., 1951.

Films

A Plant Through the Seasons
Apples

AQUA CULTURE

Books

Colby, Carroll B. Fish and Wildlife, New York, Coward-McCann, 1955.
McKeown, Martha Come to Our Salmon Feast, Binfords, 1956.

Films

A Fish Family
American Indians of Today
Field Trip to a Hatchery
Fish are Interesting
Life Between the Tides
Marine Animals of the Open Coast
Northwest Indian Art
Plankton Pastures of the Ocean

PURSE SEINING

Books

Fritz, Jean. Fish Head, Coward-McCann, 1954.
Greene, Carla. I Want To Be a Fisherman, Chicago, Children's Press, Inc., 1957.
Harrison, C. William. The First Book of Commercial Fishing, New York, Franklin Watts, Inc., 1964.

PURSE SEINING Continued

Films

Fish in a Changing Environment
Fishing for a Living (purse seine boat)
Salmon - Life Cycle of the Sockeye
Salmon Struggle for Survival

OYSTER FARMING

Films

Animal Life at Low Tide
Life Story of the Oyster
Oyster Development and Survival

WATER QUALITY

Books

Cochrane, Joanna. Let's Go to a Sanitation Department, New York, G.P. Putnam's Sons, Inc., 1958.

Films

Conserving Our Water Resources Today
Water for the Community
Water for the City

SILK-SCREENING

Books

Weiss, Harvey. Paper, Ink and Roller: Print Making for Beginners, W.R. Scott, 1958.

Films

Monotype Prints
What is Art?

CHILDREN'S THEATRE

Books

Carlson, Bennice Wells. Act It Out, Abingdon, 1956.
Milne, A. A. House At Pooh Corner, E. P. Dutton & Co.

CHILDREN'S THEATRE Continued

Books

Milne, A. A. *Winnie The Pooh*, E. P. Dutton & Co., 1926.

SPORTSWEAR

Books

Meshover, Leonard. *You Visit A Dairy-Clothing Factory*, Chicago, Benefic Press, 1955.
McCall, Edith. *How We Get Our Clothing*, Chicago, Benefic Press, 1961.
Shannon, Terry. *About Ready-To-Wear Clothes*, Chicago, Melmont Publishers, Inc., 1961.

Films

Cities and Manufacturing: Where We Make Things
Clothes We Wear, The
Factory, The
Skiing Above the Clouds

HOSPITALS

Books

Cosgrove, Margaret. *Your Hospital, A Modern Miracle*, New York, Dodd-Mead, 1963.
Elting, Mary. *The First Book of Nurses*, New York, Franklin Watts, Inc., 1951.
Hammond, Diana. *Let's Go To a Hospital*, New York, G.P. Putnam's Sons, Inc., 1959.

Films

Hospital, The

RAPID TRANSIT

Films

Cities and Transportation: Moving People and Goods

HIGHWAY CONSTRUCTION

Books

Bate, Norman. *Who Built the Highway?*
Bothwell, Jean. *The First Book of Roads*, New York, Franklin Watts, Inc., 1955.

HIGHWAY CONSTRUCTION Continued

Books

Buehr, Walter F. The First Book of Machines, New York, Franklin Watts, Inc., 1962.
Colby, Carroll B. Earth Movers, New York, Coward-McCann.
Cooke, David. How Superhighways are Made.
Greene, Carla. I Want To Be A Road Builder, Chicago, Children's Press, Inc., 1958.
Zaffo, George F. Building Your Super Highways, Garden City, New York, Garden City Books (Doubleday), 1957.

Films

Forces
Machines That Move Earth

AIRCRAFT CONSTRUCTION

Books

Wells, Robert. What Does A Jet Pilot Do?

Films

Boeing Jet Fleet
Boeing Today and Tomorrow
Jet Pilot
Lift

SMELTER

Books

Buehr, Walter. Underground Riches: The Story of Mining, Morrow, 1958.
Markun, Patricia. First Book of Mining, Watts, 1959.

Films

Conserving Our Mineral Resources Today
Iron Ore Mining

CUSTOMS INSPECTION

Books

Crawford, William. The United States Border Patrol, New York, G.P. Putnam's Sons, Inc., 1965.

POLICE DEPARTMENT

Books

Colby, Carroll B. Police, New York, Coward-McCann, Inc., 1954.
Hyde, Wayne. What Does A Diver Do?, New York, Dodd-Mead & Co., 1961.
Lewellen, John Bryan. Helicopters: How They Work, Crowell, 1955.

Films

Policemen

FIBERGLAS BOAT BUILDING

Books

Colby, Carroll B. First Boat: How to Pick It and Use It for Fun Afloat, New York, Coward-McCann, 1956.

LOCKS

Books

Buehr, Walter. Through the Locks: Canals Today and Yesterday, G.P. Putnam's Sons, Inc., 1954.

URBAN RENEWAL

Books

Barr, Donald. The How and Why Wonder Book of Building, New York, Grossett and Dunlap, 1964.
Colby, Jean Poindexter. Tear Down to Build Up, New York, Hastings House, 1960.
Goodspeed, J. M. Let's Go Watch a Building Go Up, Eau Claire, E.M. Hale, 1956.

Films

Cities and History: Changing the City

GRAIN TERMINAL

Books

Fenton, Carroll; Kitchen, Herminie B. Plants That Feed Us; The Story of Grains and Vegetables, John Day, 1956.
Smith, Marie Elizabeth. Ships Come and Go, New York, Charles Scribners Sons, 1954.

GRAIN TERMINAL Continued

Films

Boats and Ships
Central Farming Region: Food for the Nation
Changing Wheat Belt, The
Food for the City: Wheat and Flour
Wheat Farmer, The

ZOO

Books

Barker, Will. Winter Sleeping Wildlife, Harper, 1958.
Blough, Glen Orlando. Who Lives in this House?, Whittlesey, 1957.
Bridges, William. Zoo Doctor, New York, William Morrow & Co., 1957.
Bridges, William. Zoo Expeditions, New York, William Morrow & Co., 1954.
Compton, Grant. What Does A Veterinarian Do?, New York, Dodd-Mead & Co., 1964.
Goudey, Alice E. Here Come the Bears, Scribner's, 1954.
Goudey, Alice E. Here Come the Lions, Scribner's, 1956.
Wooley, Catherine. School Room Zoo, Morrow, 1950.

Films

Zoo, The

TELEVISION PRODUCTION

Books

Corbett, Scott. What Makes TV Work?
Hoake, John. First Book of Photography.
Jacobs, Lou Jr. You and Your Camera.
Stoddard, Edward. Just Plain Television.

Films

Cities and Communications: Keeping the Community Informed
Facts About Film
Facts About Projection

CHECK YOUR LOCAL SCHOOL DISTRICT CATALOGUES FOR COMPLETE FILM INFORMATION

SUGGESTED TEACHER RESOURCES

Andrews, Ralph W. Glory Days of Logging, Seattle, Washington, Superior Publishing Company, 1956.

(This book includes excellent photographs of early logging techniques.)

Appel, Fredric C. "The Coming Revolution in Transportation," National Geographic, September, 1969, Vol. 136, No. 3, pp. 301-341.

(This article emphasizes projections in the field of rapid transit.)

Breetveld, Jim. Treasure of the Timberlands, Scholastic Magazines, Inc., 1967.

Economic Education for Washington State Schools.

(This state guide includes excellent units and suggested resource materials.)

Farber, Seymour M. & Wilson, Roger H.L. Air We Breathe: A Study of Man and His Environment, Charles C. Thomas Publisher

Freeman, Otis & Upton, Rolland H. Washington State Resources, Seattle, Washington, 1957.

(A high school text.)

Gega, Peter C. Science in Elementary Education, New York, John Wiley & Sons, Inc., 1966.

(This book has excellent science experiments for use in the classroom.)

Graham, Robin Lee. "A Teenager Sails the World Alone," National Geographic, October, 1968, pp. 445-491.

(Sixteen year old Robin and two kittens sail halfway around the world in a 24 foot fiberglass sloop.)

Grosvenor, Melville Bell. "Worlds Tallest Tree Discovered," National Geographic, July, 1964, Vol. 126, No. 1, pp. 1-51.

(This is an excellent article on redwood harvesting and reseeding.)

Idyll, Clarence P. "The Incredible Salmon," National Geographic, August, 1968, Vol. 134, No. 2, pp. 194-219.

(This is a beautifully illustrated text of the spawning ritual of the sockcye salmon.)

Hilliard, Robert L., Editor. Understanding Television: An Introduction to Broadcasting, New York, Hastings House, Publishers, Inc., 1964.

Jordan, Robert Paul. "Our Growing Interstate Highway System," *National Geographic*, February, 1968, Vol. 133, No. 2., pp. 194-218.

(This article includes an emphasis on the construction and use of interstate highways.)

Milne, Lorus & Margery. *The Nature of Animals*, Philadelphia, J.B. Lippincott, Co., 1969.

(This is a comprehensive presentation of different animal types, their relationship to their surroundings and ways man has related to them.)

Pelligrini, Angelo. *Washington*, New York, Coward-McCann, Inc. (State of the Nation Series), 1967.

(There is an excellent chapter on the Simpson Timber Company program plus chapters on other natural resources of Washington state.)

Rose, Caroline B. Sociology: *The Study of Man in Society*, New York, Charles E. Merrill Books, Inc.

Senesh, L. *Our Working World*: Resource Unit, Chicago, SRA Inc., 1964.

Siks, Geraldine B. *Children's Literature for Dramatization, An Anthology*, New York, Harper & Row Publishers, 1964.

Siks, Geraldine B. *Creative Dramatics: An Art for Children*, New York, Harper & Row Publishers, 1958.

(This book provides excellent background information plus suggestions on "how to do it.")

Smith, Ray Winfield. "History Revealed in Ancient Glass," *National Geographic*, September, 1964, Vol. 126, No. 3, pp. 346-369.

(This article with its illustrations would serve as an interesting comparison of old and new.)

Stevens, James. *Green Power*, Seattle, Washington, Superior Publishing Co., 1958.

(This is a story of forest conservation in the Pacific Northwest.)

Van Lawick-Goodall, Jane. "New Discoveries Among Africa's Chimpanzees," *National Geographic*, December, 1965, Vol. 128, No. 6, pp. 802-831.

(This article tells of a young woman scientist's adventures in learning about chimpanzees in their natural habitat in Tanzania.)

Wackerman, Hagenstein & Michell. *Harvesting Timber Crops*, New York, McGraw-Hill Co., 1966.

(This book provides an excellent detailed breakdown of the harvesting process.)

Wagner, Philip. The Human Use of the Earth, New York, The Free Press, 1960. (paperback)

(This book presents a study of man's interaction with his physical work and ties in ecological, geographical, and sociological factors.)

Weaver, V. Phillips. People Use the Earth, Morristown, New Jersey, Silver Burdett Co., 1969.

(The teacher's edition of this book contains excellent material on natural resources and their use.)

The World Book Encyclopedia.

Zimmerman, Erich W. Introduction to World Resources, New York, Harper & Row Publishers.

CLUSTER OF OCCUPATIONAL MODELS

FOR TEACHER'S USE IN UNIT PLANNING:

There are a variety of workers within each occupation listed. You and your class may want to determine individual workers to study.

TRANSPORTATION

- Land Transportation
  - Local and Suburban Transit, Highway Transportation, Rail Transportation
- Aerospace Transportation
  - Commercial Aviation, General Aviation, Spacecraft Transportation
- Pipeline Transportation
  - Liquid and Gas Transmission, Solid Transmission
- Water Transportation
  - Inland Water Transportation, Ocean Water Transportation

PUBLIC SERVICE

- Financial
  - Revenue, Disbursement
- Urban Development
  - Planning and Engineering, Construction, Public Housing, Maintenance
- Regulatory Services
  - Financial, Public Records, Licensing, Customs and Immigration Facilities
- Education
  - Instruction, Transportation, Extension Services
- Police and Fire
  - Technical Support, Law Enforcement, Communications, Maintenance
- Defense
  - Military, Civil Defense
- Post Office
  - Marketing, Operations
- Public Utilities
  - Water Systems, Sanitary Service, Electric Service, Gas Service, Steam Supply
- Public Health
  - Institutional Care, Community Services, Food and Drug, Research
- Labor Affairs
  - Employment Services, Employee Compensation, Labor Standards
- Highways
  - Design and Construction, Toll and Traffic Control
- Public Transportation
  - Land, Air, Water, Control
- Social and Rehabilitation
  - Children and Youth, Adult, Family
- Courts and Corrections
  - Courts, Penal Institutions

PUBLIC SERVICE Continued

Parks and Recreation
  Development, Services, Maintenance

MARKETING AND DISTRIBUTION

Marketing System
  Retail Trade, Wholesale Trade, Service Trades, Non-Store Retailing, International Trade
Sales and Services
  Industrial Selling, Trade Selling, Consumer Selling
Buying
  Industrial Purchasing, Buying for Resale, Procurement
Sales Promotion
  Advertising, Display, Public Relations
Physical Distribution
  Product Transport, Storage, Materials Handling
Marketing Services
  Finance, Credit, Insurance, Research

MARINE SCIENCE

Marine Biology
Commercial Fishing
  Ocean Fishing, Seafood Processing, Seafood Inspection, Seaweed Harvesting and Processing, Sport Fishing Enterprises
Aqua Culture
  Marine Fish or Shellfish Culture Research, Marine Plant Grower, Fish Hatching, Raising
Marine Transportation
Marine Exploration
  Oceanographic Mapping and Charting, Ocean Mineral Exploration, Ocean Current and Water Research
Underwater Construction and Salvage
  Offshore Mineral Production, Underwater Engineering Research, Deepwater Diving and Life Support, Underwater Construction, Underwater Salvage Demolition

PERSONAL SERVICE

Physical Culture
Barbering
Mortuary Science
Cosmetology
Household Pet Service

CONSUMER AND HOMEMAKING EDUCATION

Childcare, Guidance and Teaching
Family and Community Services
Institutional Household Maintenance Services
Housing Design, Interior Decoration
Inter-Changeable Technician for Homemaking
  Home Management, Consumerism, Personal-Family Relationships
Food Service Industry
  Production and Management, Service and Delivery, Testing and Product Development, Nutrition
Clothing, Apparel, and Textile Industry

FINE ARTS AND HUMANITIES

Fine Arts
  Creating, Performing, Performing Arts Design, Performing Arts Production, Artist Management, Visual and Graphics Design, Media
Humanities
  Creative Writing, Languages, History

MANUFACTURING

Design
  Product, Process, Equipment
Materials
  Natural, Synthetic, Receiving, Waste Output
Production
  Production Processing, Quality Control
Distribution
  Packaging, Marketing, Advertising, Transportation, Warehousing
Research
  Product, Process, Marketing

HOSPITALITY AND RECREATION

Counselling
Therapy
Media
Accessibility
Spatiality
Arts
Movement
Entertainment
Eduaction
Special Groups
Humanities
Preventive Health
Time/Income Commodities

HOSPITALITY AND RECREATION Continued

Human Service
Natural/Physical Environment

HEALTH

- Health Information Systems
  - Medical Records, Medical Library Science, Medical Illustration and Photography, Vital Statistics
- Health Services Delivery
  - Health Maintenance, Community Health Services, Hospital and Long Term Care Services, Pediatric Care and Services, Geriatric Care and Services
- Mental Health, Mental Illness and Retardation
  - Care of Mentally Retarded, Mental Health Maintenance, Psychiatric Services
- Accidents, Injuries, and Emergency Services
  - First Aid and Rescue, Medical Emergency, Accidents and Poisoning, Control and Prevention
- Dental Science and Services
  - Dental Health Maintenance, Dental Care, Dental Restoration
- Pharmaceutical Science and Services
  - Regulation and Control, Production of Drugs, Retailing and Distribution
- Medical Science and Services
  - Science Basic to Medical Services, Surgical Care and Services, Medical Care and Services
- Biological Science and Technology
- Health Service Administration
  - Public Health Administration, Institutional Administration, Private Health Services, Health Maintenance Systems

COMMUNICATION AND MEDIA

- Publishing
  - Graphic Arts, Journalism, Commercial Art
- Broadcasting
  - Radio/Television, Satellite Transmissions, Laser Transmission
- Line Communications
  - Data Transmission, Telegraph, Telephone

CONSTRUCTION

- Design
  - Architectural, Civil
- Contracting
  - Crafts, Material Procurement, Equipment Operations, Office Operations
- Land Development
  - Site Preparation, Utilities
- Fabrication and Installation
  - Field Operations, Building Systems, Material Fabrication

CONSTRUCTION Continued

- Interior
  - Design, Decoration, Furnishings
- Landscaping
  - Nursery Operations, Grounds Maintenance

AGRI-BUSINESS AND NATURAL RESOURCES

- Support and Regulations
  - Guardianships, Safety and Regulation, Conservation
- Research
  - Experimentation, Water, Dissemination
- Forestry
  - Production, Services, Conservation, Processing and Marketing
- Land and Water Management
  - Parks, Inland Waterways, Hydro-Electric Power
- Fisheries and Wildlife
  - Management, Production, Utilization
- Mining and Quarrying
  - Exploration, Production, Processing and Storage, Distribution
- Petroleum and Related Products
  - Exploration, Production, Services, Distribution
- Support and Regulations
  - Inspection and Regulatory, Government Programs
- Research
  - Experimentation, Dissemination
- Production
  - Crops, Animals and Fish, Horticulture Products
- Service
  - Supply, Business
- Processing and Marketing
  - Selecting and Purchasing, Processing, Distribution

ENVIRONMENT

- Soil and Mineral Conservation and Control
- Space and Atmospheric Monitoring and Control
- Environmental Health Services
- Development and Control of Physical Man-Made Environment
  - Urban Planning, Urban Development and Renewal, Rural Development, Ornamental Horticulture, Civil Technology Process, Noise Abatement and Control, Solid Waste Pollution Abatement and Control
- Forest, Range, Shore and Wildlife Conservation and Control
  - Research and Experimentation, Resource Survey and Monitoring, Resource Development, Resource Protection, Utilization Control
- Water Resource Development, Conservation and Control
  - Research and Experimentation, Water Pollution Abatement and Control, Civil Technology Processes, Recreation Development and Management, Utilization Control

BUSINESS AND OFFICE

Accounting, Computing and Data Processing
  Accounting and Computing, Business Data Processing
Information Processing Communication
  Information Communication, Stenographic, Secretarial Related, Typing and Related, Filing, Office Machine and General Office Clerk
Material Support: Transporting, Storing, Recording
Supervisor and Administration
Management
  Personnel, Training and Related Work, Supervisory and Administrative Management